ELECTRICAL REVIEW

18 JULY 1958

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BROOK MOTORS Ltd
HUDDERSFIELD • ENGLAND

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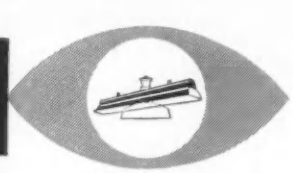
Without a shadow...of doubt

install BENJAMIN REGD. Flurolier Lighting Fittings

To meet Industrial demands for the highest level of illumination in factories, The Benjamin Electric Ltd., offer a range of Flurolier Fittings—in single or continuous runs—for fluorescent lighting. Unobtrusive in appearance, Flurolier Fittings provide a cut-off in accordance with factory regulations; are adaptable to every method of installation; have an exclusive lampholder design and are easily detached for cleaning or maintenance. All in all, Flurolier Fittings are industries' choice *without a shadow of doubt*. *Please send for full details of the complete Flurolier range.*

FOR CONSTANT, HARDWEARING PROTECTION FLUROLIER REFLECTORS ARE FINISHED IN 'CRYSTEEL' VITREOUS ENAMEL WHICH GIVES A PERMANENTLY WHITE, HIGHLY REFLECTIVE SURFACE.
FOR LESS ARDUOUS CONDITIONS ASK ABOUT 'PEROPAL' FINISH.

Better lighting by BENJAMIN REGD.



THE BENJAMIN ELECTRIC LTD · TOTTENHAM · LONDON N.17
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Smee's 117

30,000 miles of wire a day. Enough to circle the world with some to spare. L.E.W. are the largest producers of insulated wires and strips in Europe.

Production ranges from heavy strip for stator windings down to the finest resistance wires for the electronic industries. New products, constantly under development for the electrical, radio and electronics fields, match the present range in quality and unfailing efficiency.

The Lewcos reputation is second-to-none.

L·E·W

WIRESMITHS TO THE WORLD

THE LONDON ELECTRIC WIRE COMPANY AND SMITHS LIMITED

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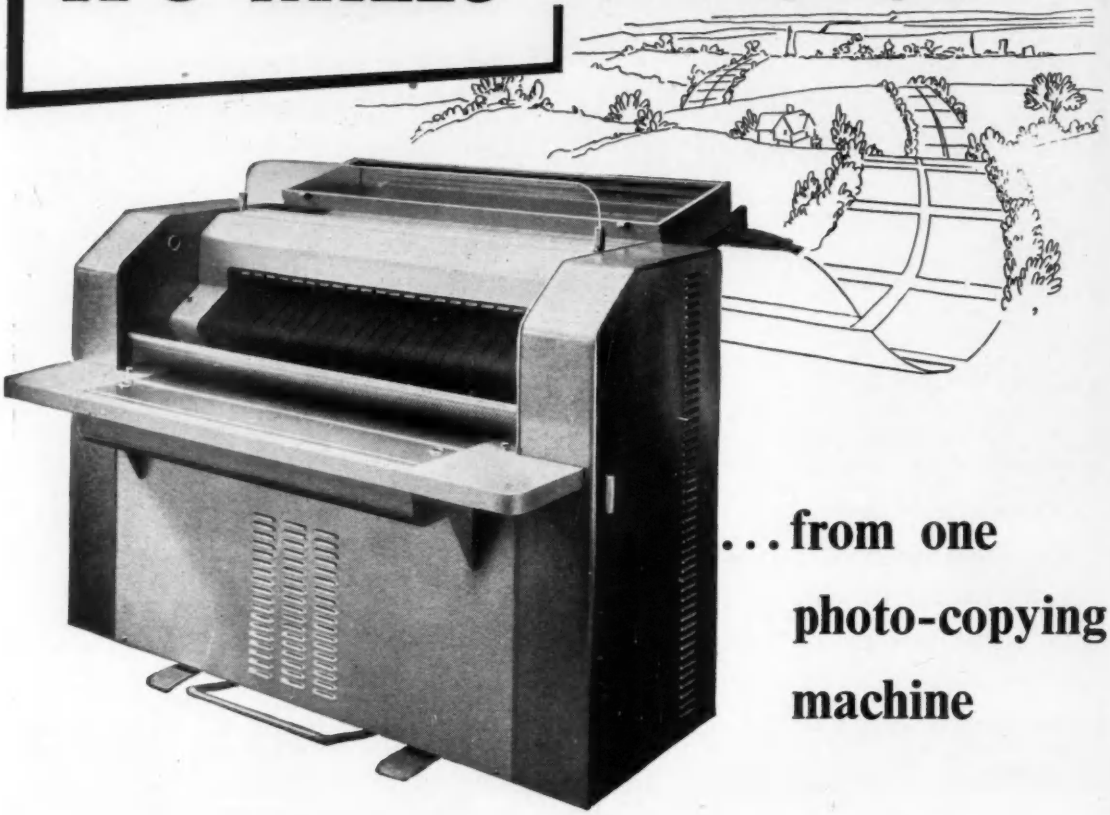
175 MILES *of prints per year . . .*



. . . from one photo-copying machine

175 miles of prints a year is the output reported by one regular user of an Azoflex Model 46/35—and that's the sort of output that any busy drawing office can expect. The AZOFLEX photo-printing process combines several unique features. It's the *only* daylight reflex copying process. It's the *only* process to apply a measured quantity of developer irrespective of running speed, thus ensuring optimum quality. It avoids the use of dangerous chemicals and there are no unpleasant fumes. Operation is quiet and free from vibration. Exposing, developing and print delivery are all synchronised to ensure an even flow of finished work at all speeds.

AZOFLEX MODEL 46/35 combined synchronised printer and developer. Capacity : cut sheets and rolls up to 42 in. wide. Printing speed: up to 30 ft. per minute. Dimensions : Height 58 in. Depth 60 in. Width 72 in. Weight 1,100 lb. Price £1,555 (including delivery and installation in the U.K.).

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CURRENT VOLTAGE CONTROL

The First COMPLETELY Automatic, inherently SAFE Electric Vehicle Battery Charger

C.V.C. charging offers the greatest advantages where several batteries have to be charged. It permits the shortest charging time for a single battery (3½ hours without exceeding the gassing limit normally associated with rapid charging) and also the shortest time per battery by parallel charging. Charging is simplified. (No relay, Battery Thermostat or switch). Batteries are charged with complete safety ensuring a longer life. The upkeep of the whole fleet is cheaper.

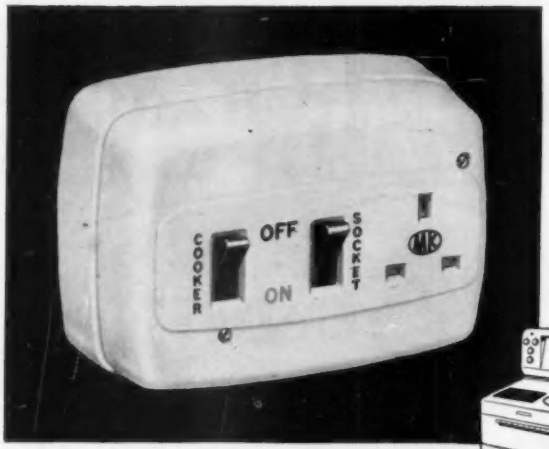
Approved and recommended by leading battery makers.

THE DAVENSET C.V.C. CHARGER is an *Economic Necessity* for all electric vehicle fleet owners

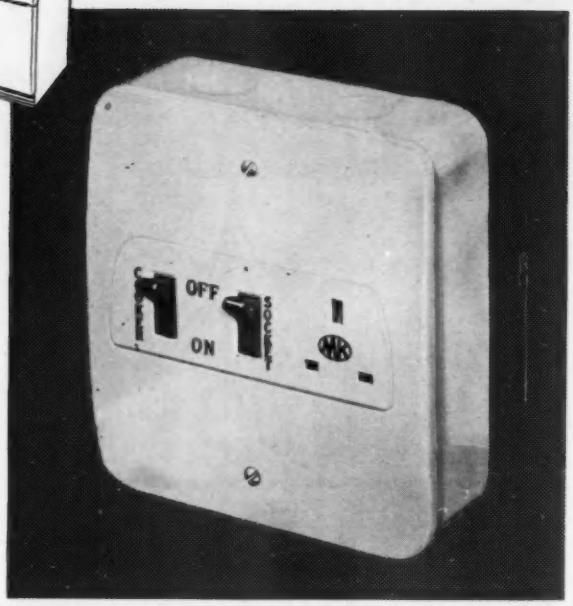
For complete details write to the makers :—

PARTRIDGE WILSON & CO. LTD. DAVENSET ELECTRICAL WORKS, LEICESTER

MK153 DHB



The MK Range of COOKER CONTROL UNITS has EVERYTHING!



9 types to choose from — surface or flush, metalclad or insulated, with or without pilot lamps, 13 ampere or 15 ampere auxiliary circuits.

MK have been specialists in cooker control unit design for many years, and the current range offers you a wide choice of units that are as easy to wire as they are smart to look at. There is an MK design for every installation.

LOOK AT THESE FEATURES!

* Indicating units have two long-life neon lamps visible from almost any angle
* Complete interior built as one integral unit
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* Flush units have adjusting screws for raising or lowering interior
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* Current-carrying and earthing circuits solidly riveted at all connecting points
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* Completely new double pole switches with pure silver contacts
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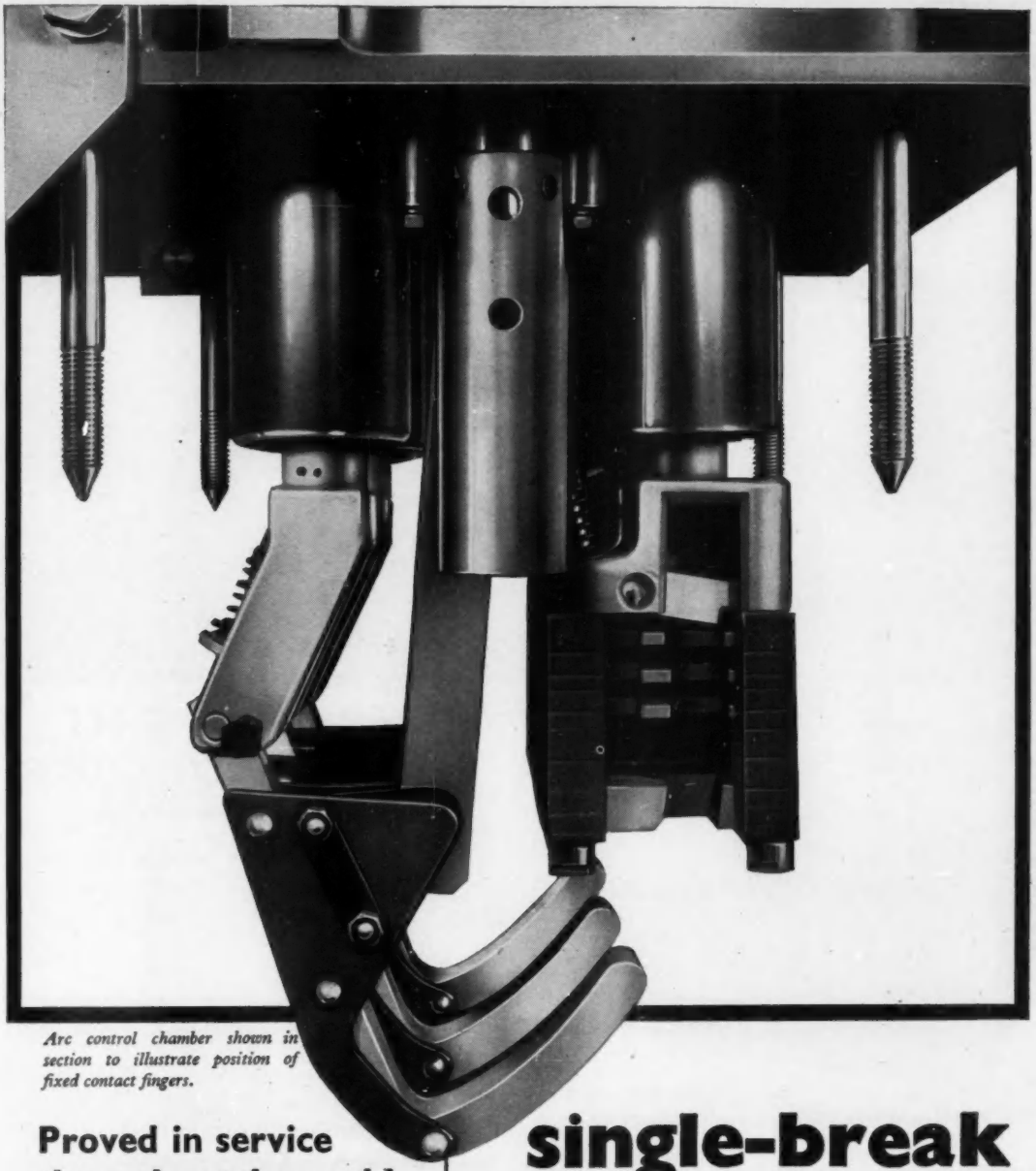
* Switches have successfully withstood mechanical tests in excess of 100,000 operations
* All mouldings are of urea formaldehyde
* Case and cover-plate are of zinc-coated steel. The ivory stove enamel finish matches the moulded inserts
* Switch handles are moulded in red for contrast. Both circuits are clearly identified

MK .... the mark of leadership

M. K. Electric Limited, Wakefield Street, London N.18 Edmonton 5151



Arc control chamber shown in section to illustrate position of fixed contact fingers.

Proved in service throughout the world

BTH single-break oil circuit-breakers—designed for metalclad switchgear—have the inherent advantages of compactness, simplicity, and ease of maintenance. The arc-control chambers and silver-plated high-pressure line contacts ensure high performance and consistent operation.

single-break oil circuit-breakers

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up to 15 kv. up to 2,000 amp.

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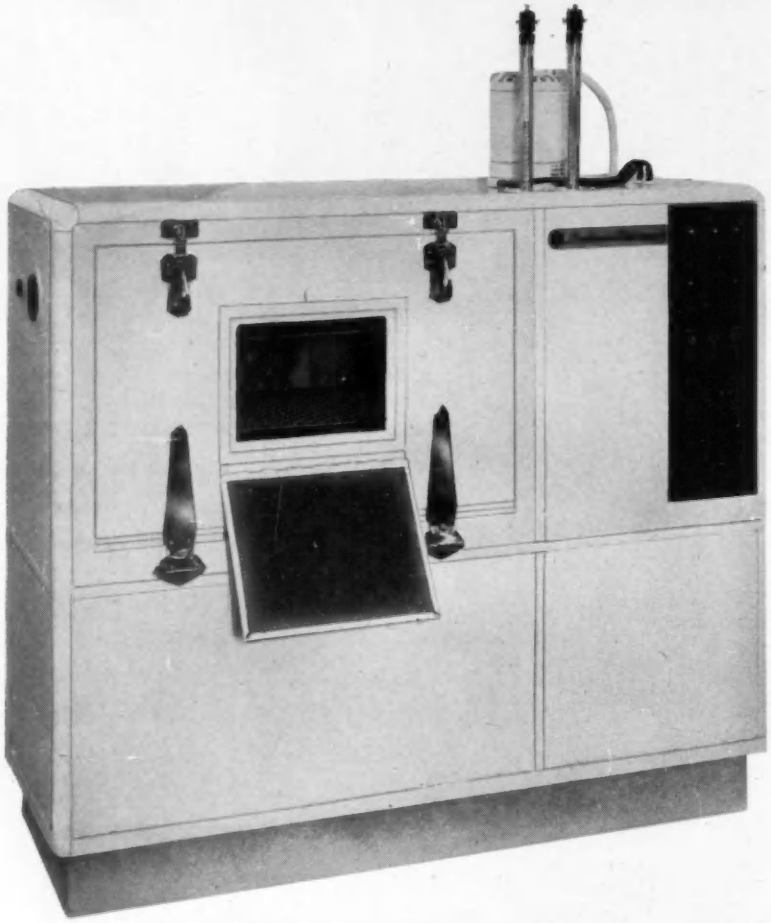

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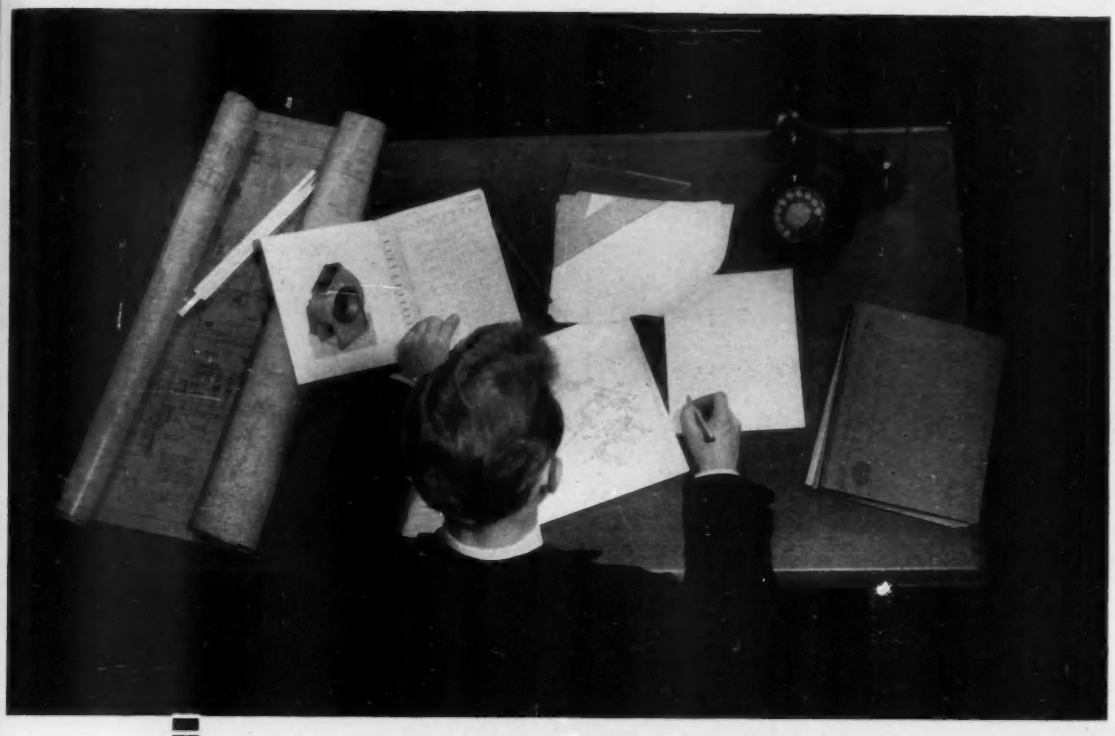

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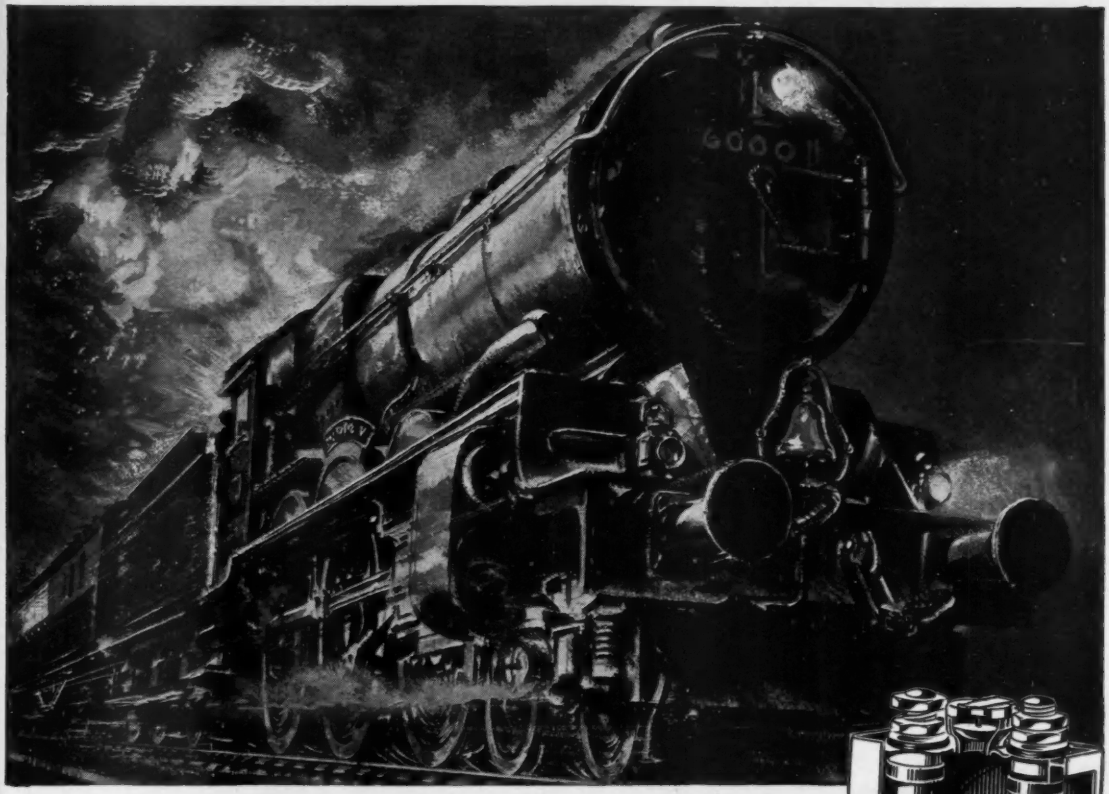
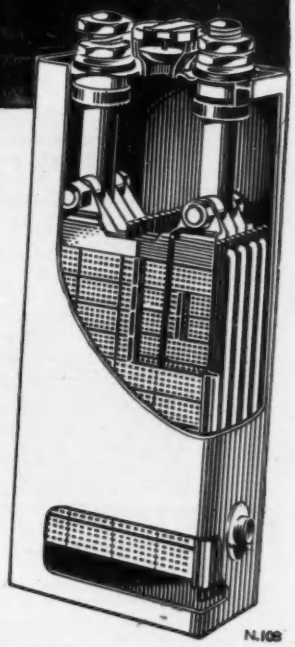
GORTON ROAD – MANCHESTER 12

Which battery is built like the King George V?





Its name is Nife! This exceptionally tough battery is also made of steel and like the King George V is built to last—to withstand shock and vibration and to stand up to severe mechanical conditions. Unlike this giant locomotive, however, a Nife battery is small and compact, takes up very little room and requires virtually no maintenance. Also a Nife battery withstands the heaviest discharge, is free from self-discharge and is unaffected by idleness in any state of charge. *It repays its original cost many times over!*

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BATTERY ELECTRIC TRUCKS AND LOCOS

Its name is NIFE

—THE **STEEL** ALKALINE BATTERY

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1" 1½" 2" 2½" and 3"

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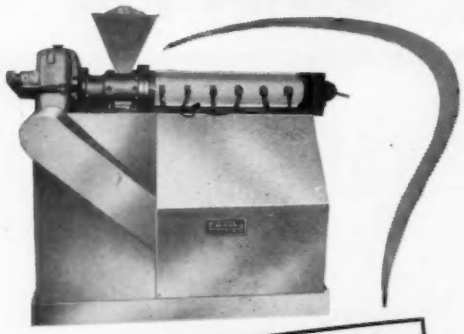

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Write for full details.

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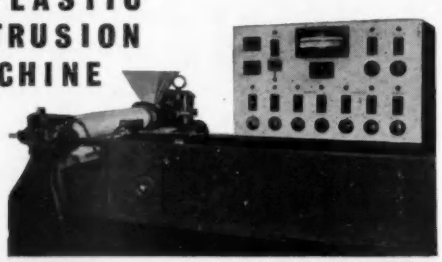

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Division of Catmur Machine Tool Corporation Ltd.

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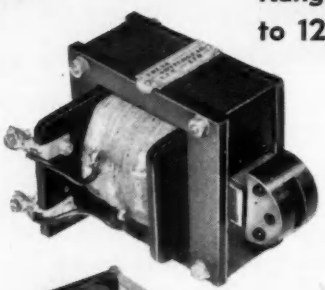

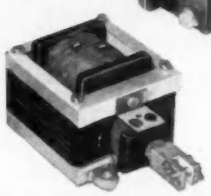

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formerly Electrical Products (Colne) Ltd.

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New... THORN PYGMY POWER RELAY

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* ***Dust proof—transparent plastic cover.***
* ***Plugs into any standard International octal valve base.***
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* ***Mechanical life over 10,000,000 operations.***
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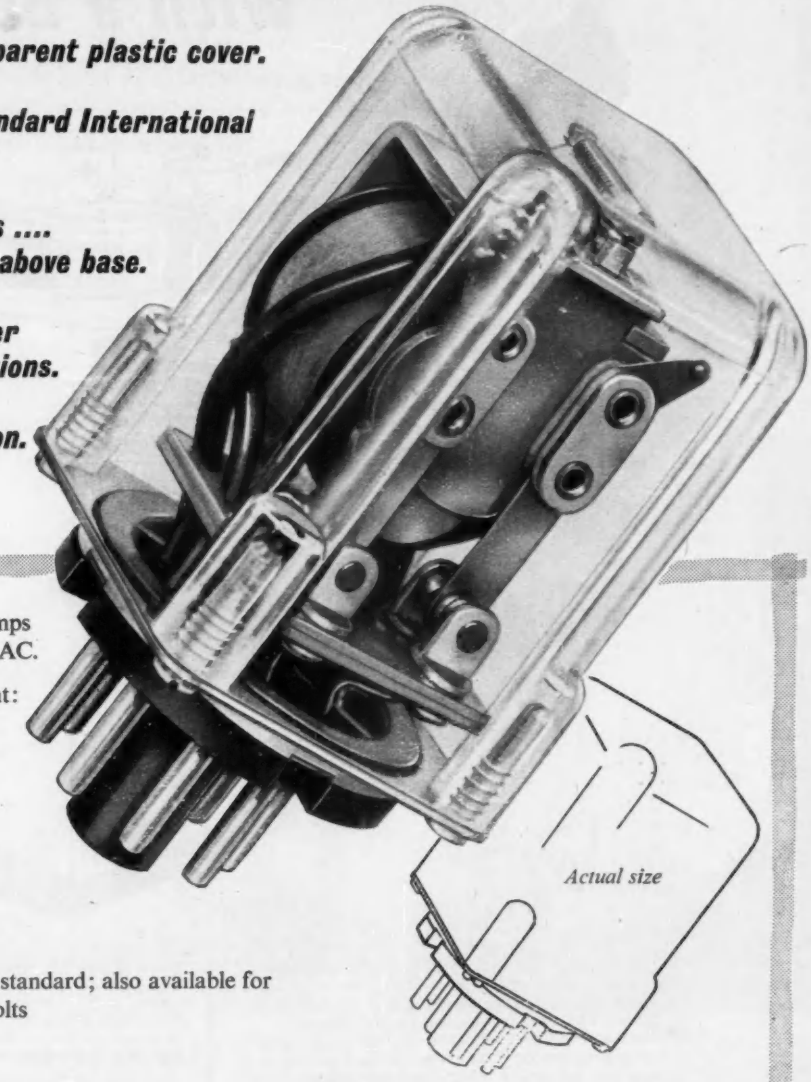

Switching current: 5 amps maximum at 250 volts AC.

Maximum surge current: 10 amps.

Operate time: 8 milliseconds approx.

Release time: 6 milliseconds approx.

Overall dimensions: 1⅜″ square by 2⅜″

Coil voltage: 240 volts standard; also available for 6, 12, 24, 48, 60, 110 volts

The Thorn Pygmy Power Relay—the most economically priced relay of its type

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The hotcupboard which houses the grill provides ample space for keeping plates and food warm as well. It's fitted with a door which keeps the heat in and gives the cooker that nice neat and tidy appearance when not in use.

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With drawer as shown £37.13s.0d.

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for driving at EXACT speeds

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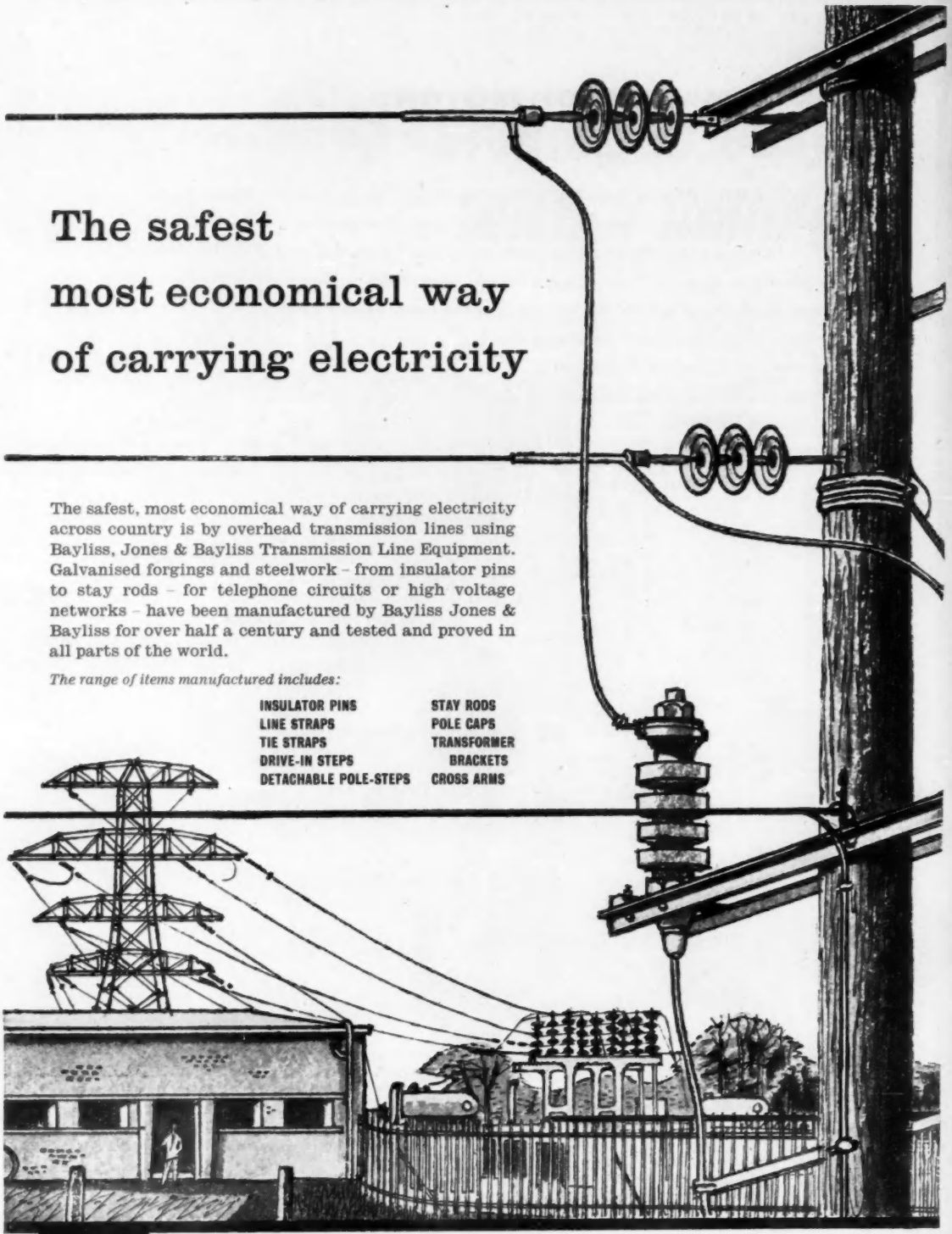
The safest most economical way of carrying electricity



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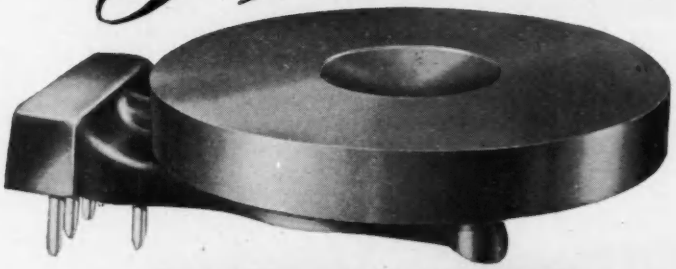
THE *Jackson*



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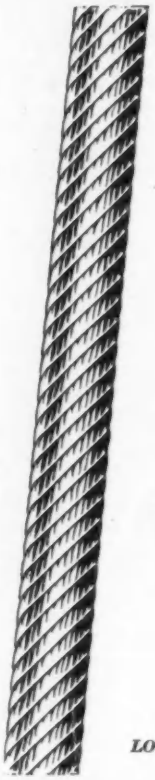

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This contract is typical of the many which London Electric Firm handle during the course of their business. They have the experience and "know-how" so essential for this specialised job.

Get in touch with them when you need winches. Besides designing to special requirements they also manufacture a range of standard hand winches.

L&F

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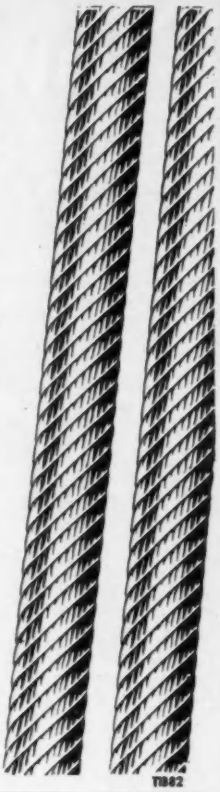

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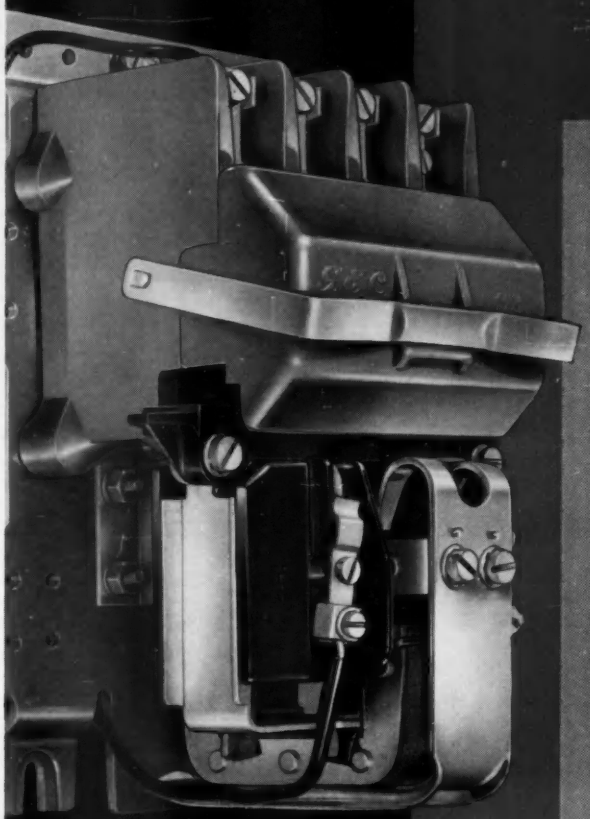
VERTICAL-LIFT

contactors



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MAGNET HOUSE, KINGSWAY, LONDON
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Osram the GUARANTEED Tube

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Osram Guaranteed Tubes for trouble-free lighting

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"There's none better. I say THERE'S NONE BETTER. When you fix a Wootton Meter Board it's fixed for keeps. Unaffected by climatic changes — no contraction or expansion. Wootton means that extra something that makes all the difference."

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Weatherproof and *Flameproof*

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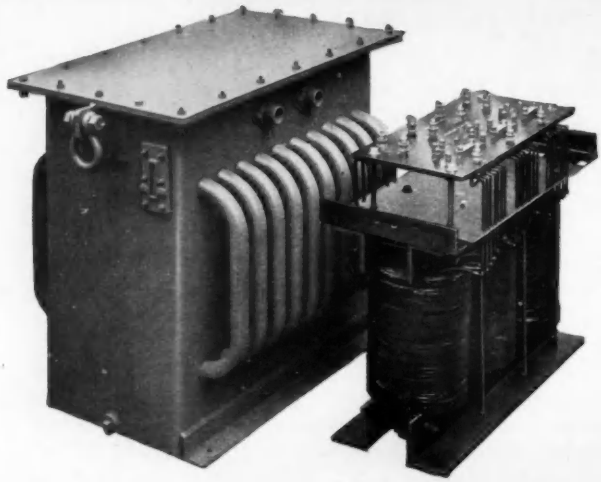

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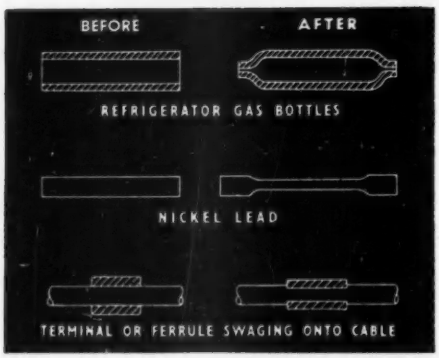

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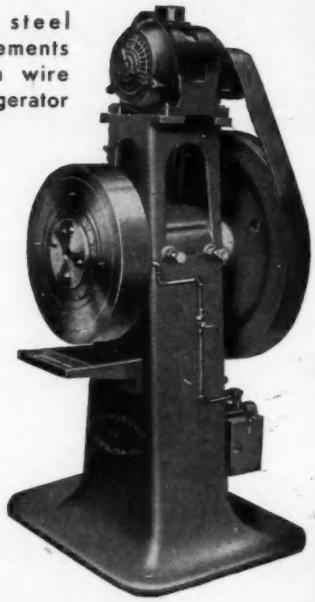

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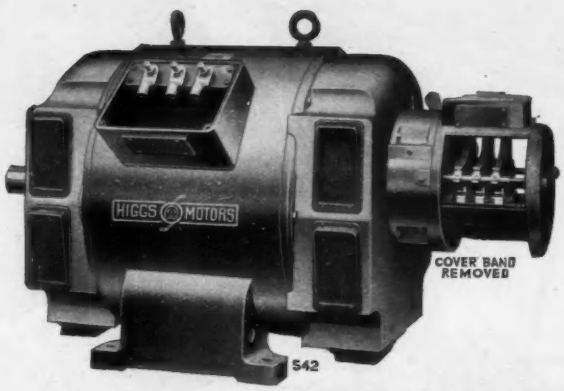

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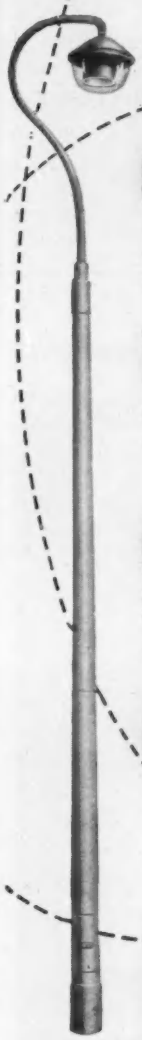

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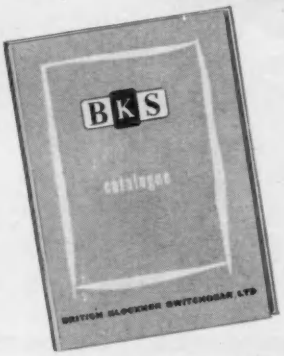

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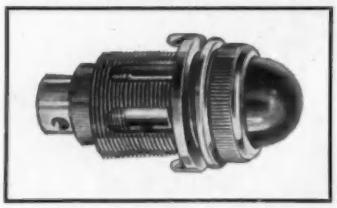
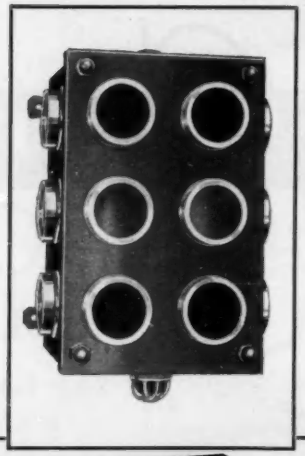
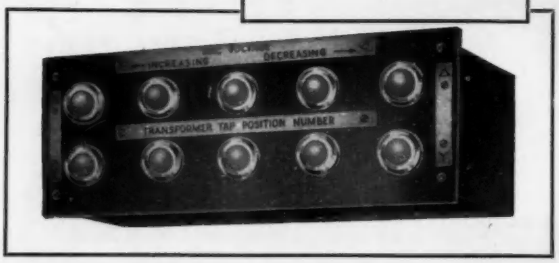


—switches, relays, etc., can be incorporated as necessary





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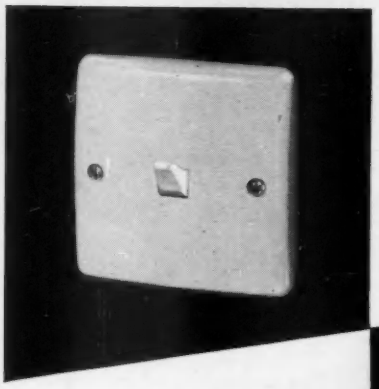

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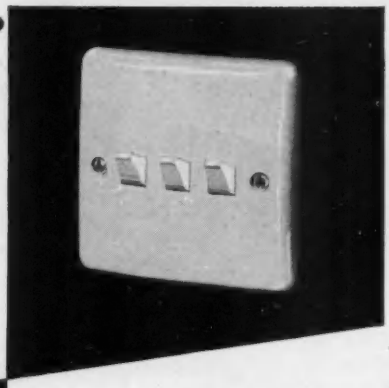

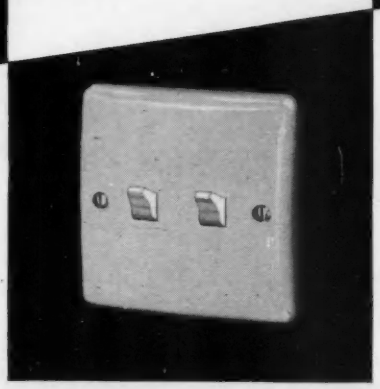

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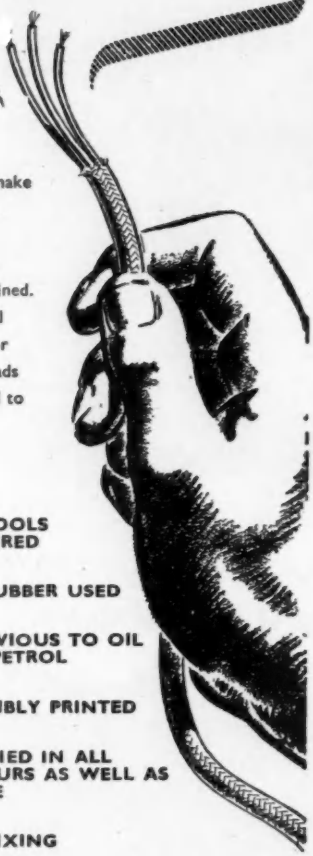

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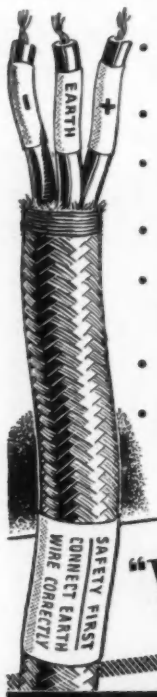

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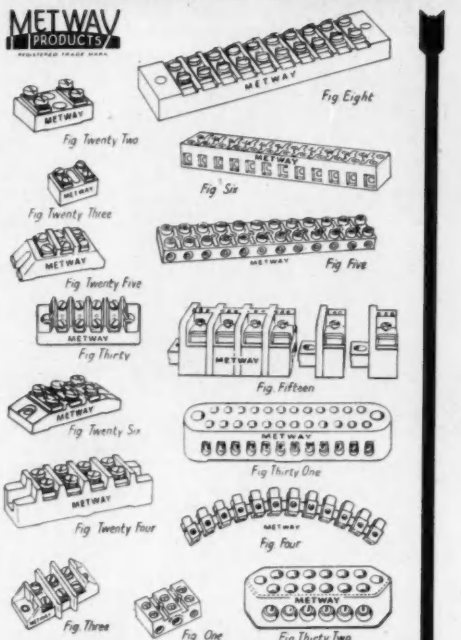

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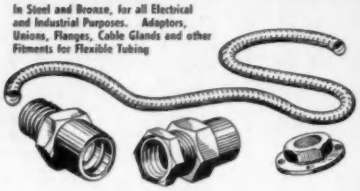

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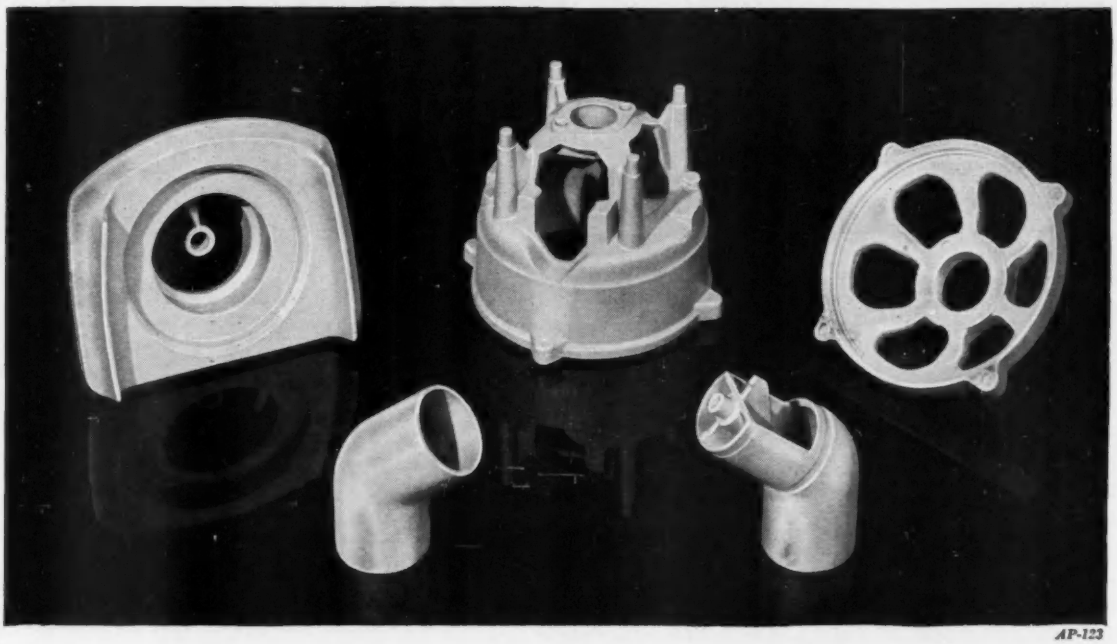

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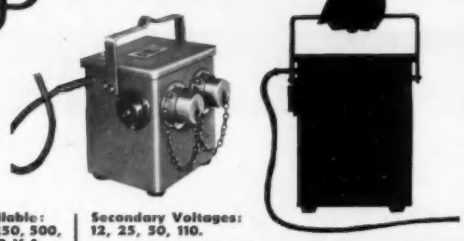

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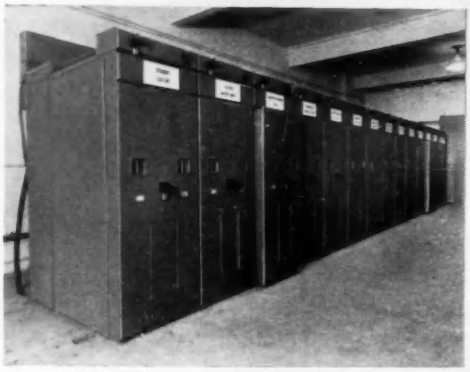

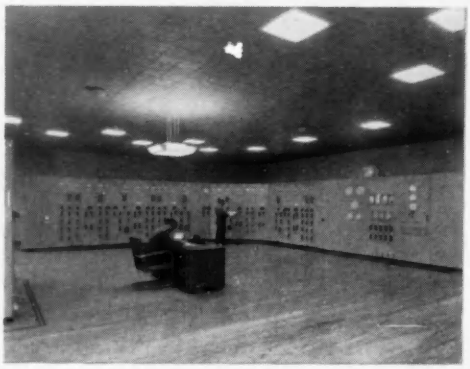

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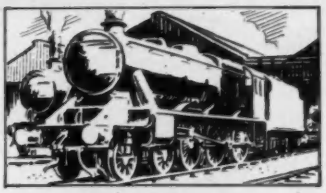

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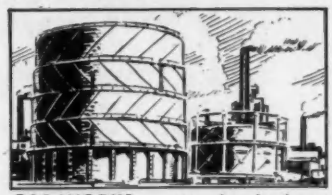

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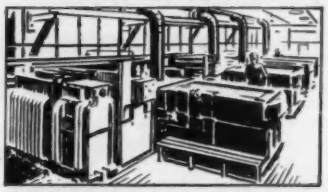

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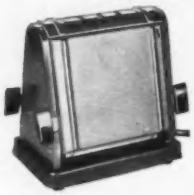

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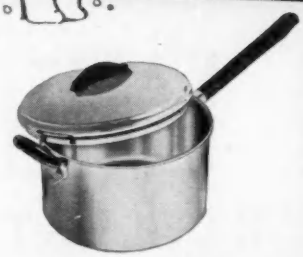

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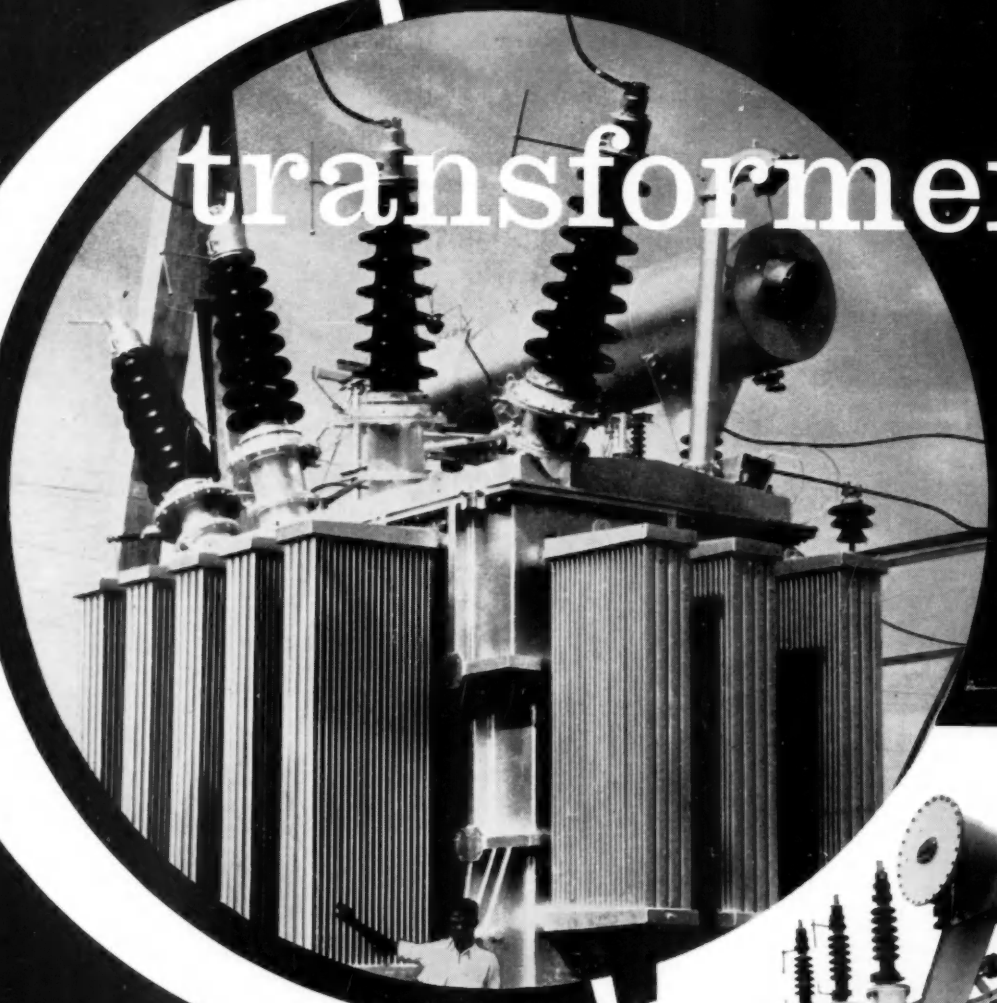

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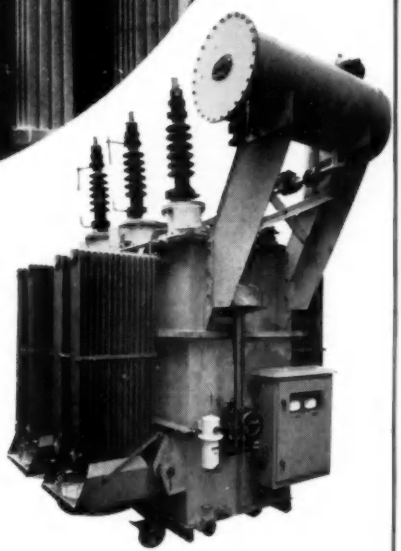

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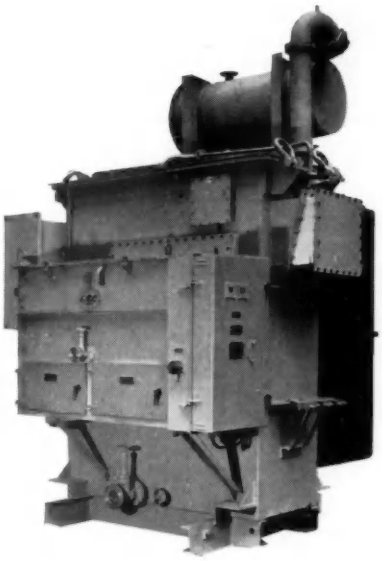
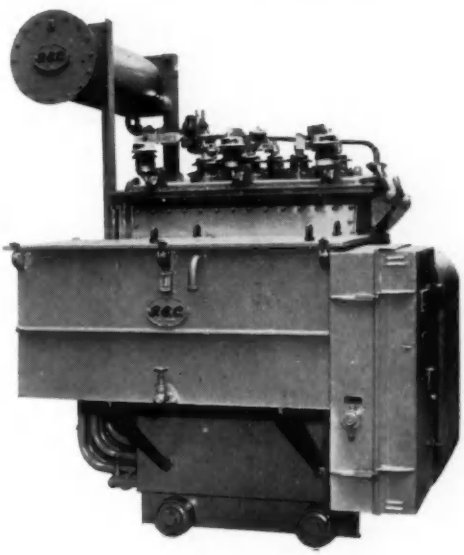
technicians of this great organisation.

nsformer.



CANADA 2500 kVA 13.8/2.4 kV 60 c/s transformer fitted with on-load tap-changing switch for Niagara.



SOUTH AFRICA 2500 kVA 3.3/3.3 kV transformer fitted with on-load tap-changing switch for the Rand mines.

er transmission equipment

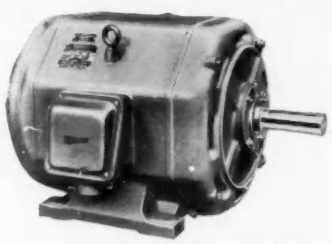
HEAD OFFICE: MAGNET HOUSE KINGSWAY LONDON WC2 · THE GENERAL ELECTRIC COMPANY LIMITED OF ENGLAND.

Newman IN STEP WITH PROGRESS

DOUBLE COOLING

One of the most important aspects of totally enclosed motors is the method of cooling—upon this depends, to a large extent the efficiency, reliability, size for rated horsepower and ultimately the final cost of the motors.

Newman have recently introduced a range from 25-150 h.p. with a unique double ventilation system which almost doubles the cooling efficiency of these motors and results in more economical and more compact construction.



DOUBLE AIR CIRCUIT MOTOR

YET ANOTHER EXAMPLE OF THE NEWMAN PROGRESSIVE DESIGN POLICY

Newman

making the pace in motor progress

NEWMAN INDUSTRIES LIMITED, YATE, BRISTOL

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NOW it's launched!

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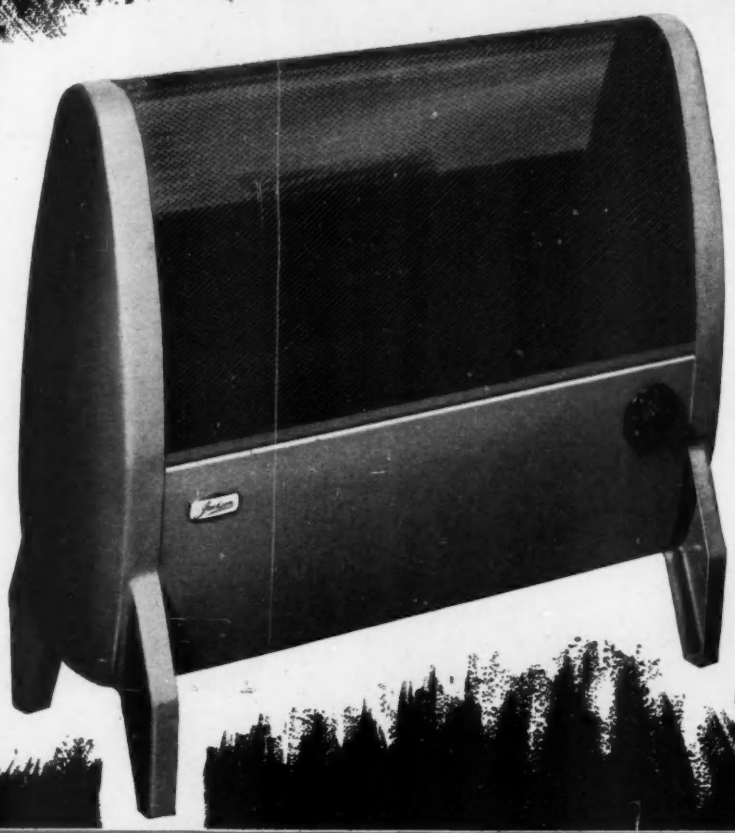

THE JACKSON 777

THE 'HEATWAVE' (Catalogue No. 777) is bound for astronomical success! No other 2 kW convector heater gives such value for money as the Jackson 777. It has styling that's streamlined and graceful. It's light and easily carried. The mushroom finish tones with all colour schemes.

And the price?

777 J. with thermostatic control A.C. only 2 k.W.

ONLY £6. 19s. 6d.
(including P.T. £1. 5s. 1d.)

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ONLY £6. 7s. 6d.
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For satisfaction—sell them **Jackson**

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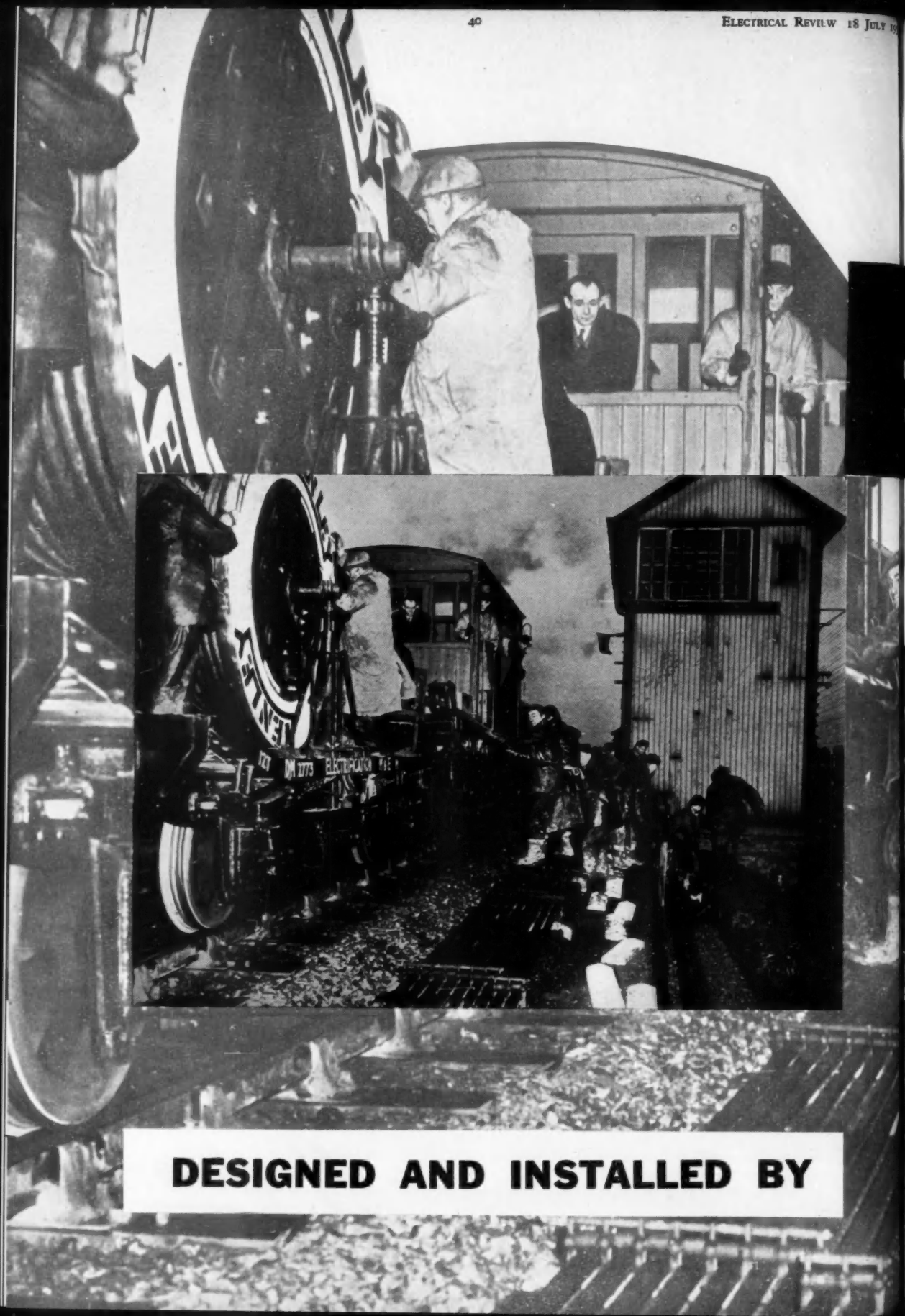
Branches: Belfast, Birmingham, Cardiff, Glasgow, Leeds, Liverpool, Newcastle-on-Tyne



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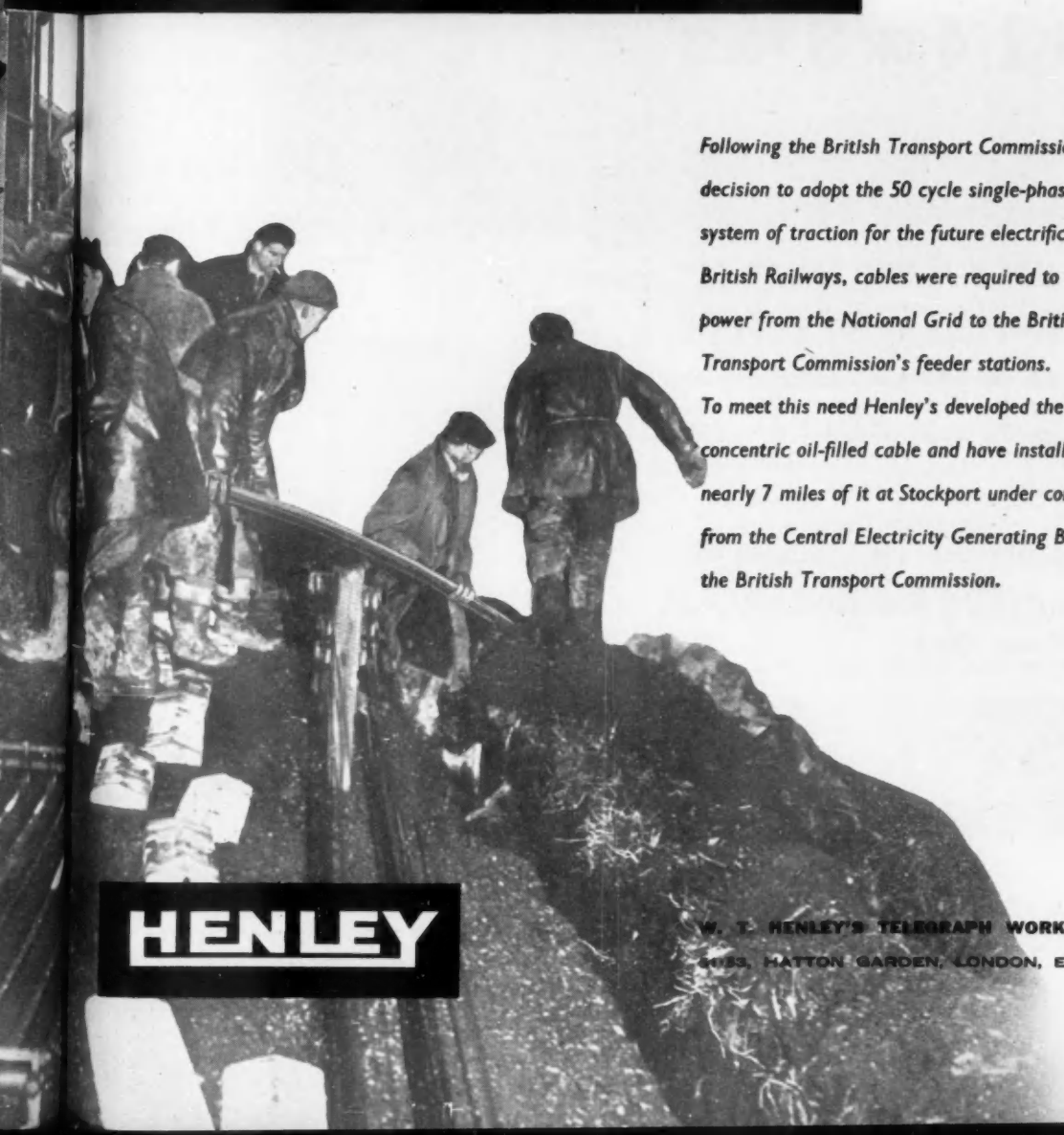
By appointment to
H.M. The Queen
Electric Cable Manufacturers

THE FIRST 25kV CONCENTRIC OIL-FILLED CABLE

for railway electrification in Great Britain



Following the British Transport Commission's decision to adopt the 50 cycle single-phase overhead system of traction for the future electrification of British Railways, cables were required to transmit power from the National Grid to the British Transport Commission's feeder stations.

To meet this need Henley's developed the new 25kV concentric oil-filled cable and have installed nearly 7 miles of it at Stockport under contracts from the Central Electricity Generating Board and the British Transport Commission.

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W. T. HENLEY'S TELEGRAPH WORKS CO. LTD.
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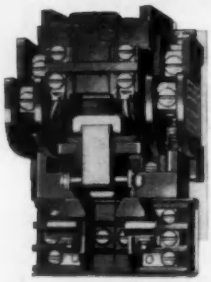
A.C. POWER RELAYS

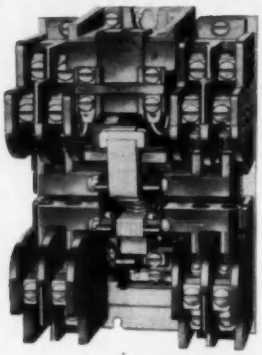
WITH 2-4 OR 8 POLES

Any pole can be supplied "Normally-open" or "Normally-closed"; double-break main contacts rated at 10 amps. 550-volts maximum. One or two auxiliary change-over contacts can be added in addition to main poles. Tractive coils available—6 to 550-volts A.C.

The relay, when open style, is supplied with back fixing plate suitable for mounting on insulation or steel panels, or in metal cases.



● 2-pole Open Style Relay with two changeover coil circuit contacts.



● 8-pole Open Style Relay with one changeover coil circuit contact.

● 4-pole Enclosed Relay.

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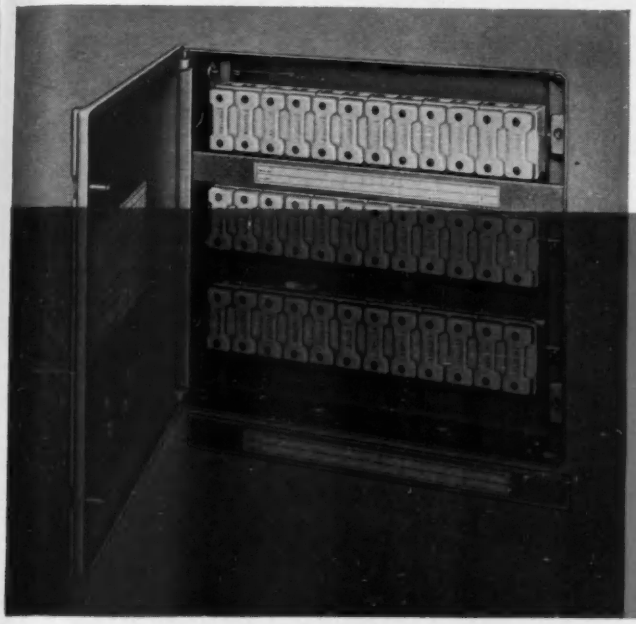
Sales Engineers available in LONDON, BIRMINGHAM, MANCHESTER, GLASGOW, BELFAST, BOURNEMOUTH



see *anything* *missing?*

Anything missing? Well, to complete the picture, we should insert cables or conduits, mount the whole job...

Which is where you can run into trouble — and money. But not with Simplex Regent! Here once again is the *rational* approach — electrical equipment designed not only for dependability and good appearance, but also for really easy assembly, installation and modification. Which all adds up to lower *installed* cost!

among a host of good points...

SUITABLE FOR FLUSH OR SURFACE INSTALLATION

PLASTER MAY EXTEND TO CASE EDGES IN FLUSH MOUNTING

COMPLETE ACCESSIBILITY — MAXIMUM VERSATILITY

500V 15 & 30 Amp surface or flush

it's the *installed* cost that counts!

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Simplex

this man works for you...

Simplex have a whole team of practical experts — whose job it is to help you with designing, building and advice on Simplex Switchboard installations. Write or telephone the Simplex Switchboard Service

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Simplex Electric Co Ltd Oldbury Birmingham

Branches throughout Britain and agents throughout the world.

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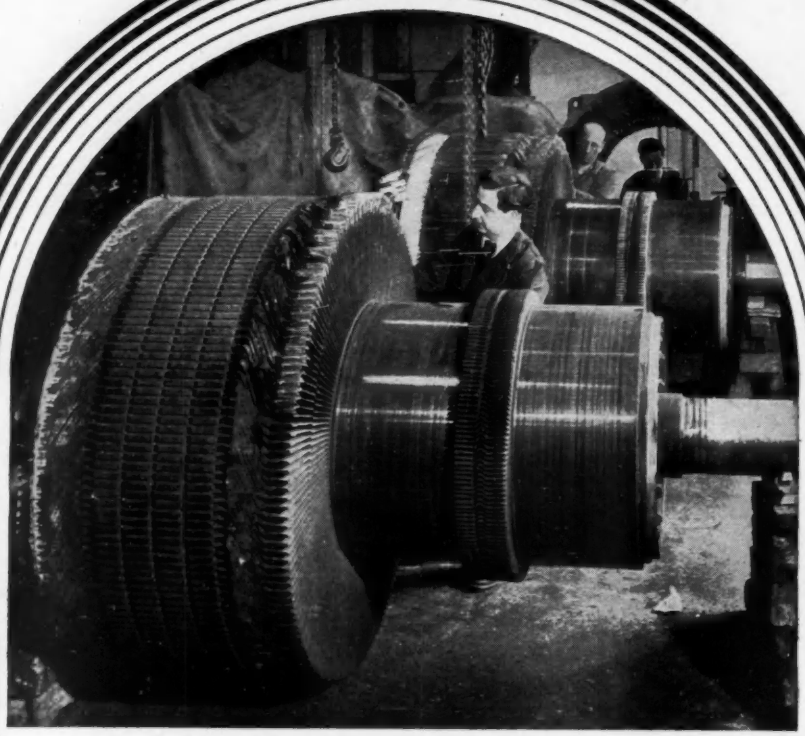

Engineers' Language! For every Plant Engineer who swears at Collins, there are ninety-eight and a quarter who swear by them. Engineers being engineers, this is quite something. As we were saying, we show two 1500kW 240-volt 600 r.p.m. D.C. Generators, one being stripped out for rewinding, t'other being rewound.

COLLINS

Collins Electrical Ltd.

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Central London Works

22 *St. Albans Place Upper Street Islington N* 1

West London Works

9 *&* 11 *Featherstone Road Southall*

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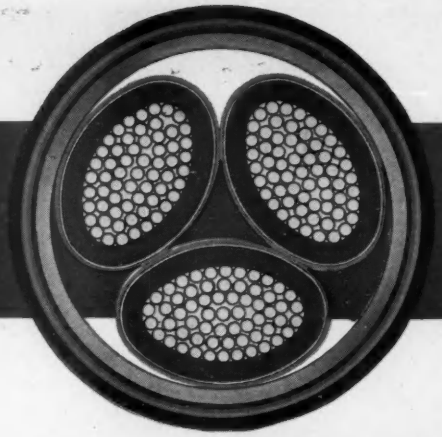


D S O

FOR ECONOMY

in Oil-filled Cables

SOUTH AFRICA... *the First installation*

The advantages of D.S.O. Cables have already been recognised. Some 21,000 yards of 33kV *aluminium sheathed, aluminium conductor* cables are being installed at Bloemfontein, South Africa by our associate BICC (S.A.) (Pty.) Ltd. This project will link Bloemfontein power station with major distribution points at Bayswater and Dan Pienaar.

Here is BICC's latest development in 33kV power transmission — the Ductless, Shaped-Conductor, Oil-filled Cable. Dispensing with fillers and built-in ducts, this new design is essentially one of economy in materials, resulting in reduced cable costs. A full range of joints and terminations has been specially designed by BICC for use with this cable.

D.S.O. Cables can be supplied with aluminium sheaths or reinforced lead sheaths and copper or aluminium conductors. Frequently the all-aluminium D.S.O. Cable (aluminium conductors and aluminium sheath) offers the most economical design.

Further information on D.S.O. Cables is contained in Publication No. 392—available on request.

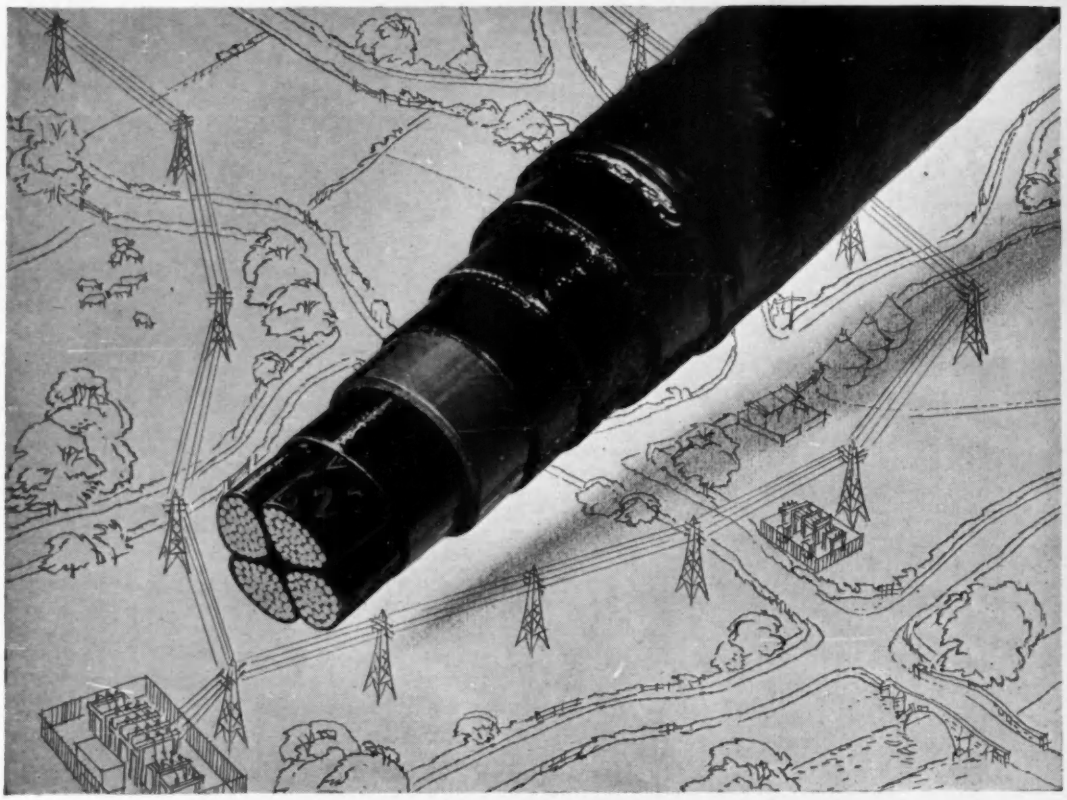
BICC

DSO

DUCTLESS SHAPED-CONDUCTOR OIL-FILLED

33kV CABLES

BRITISH INSULATED CALLENDER'S CABLES LIMITED · 21 Bloomsbury Street, London, W.C.1



Worthy of their vital role!..

It goes without saying that in the manufacture of Britannic Cables are concentrated a wide knowledge of materials, latest manufacturing technique and conscientious craftsmanship. That's why their quality and reliability has earned the confidence of engineers all over the world . . . why Britannic cables are now specified more than ever before.

What does need to be emphasised is that Britannic Cables have established themselves over the years as an independent company, supplying the electrical distribution industry and also have been concerned with all types of electrical power installations both at home and overseas.

All cables made by Britannic conform to the relevant requirements of the British Standards Institution.

SPECIFY BRITANNIC FOR YOUR NEXT PROJECT!

BRITANNIC CABLES

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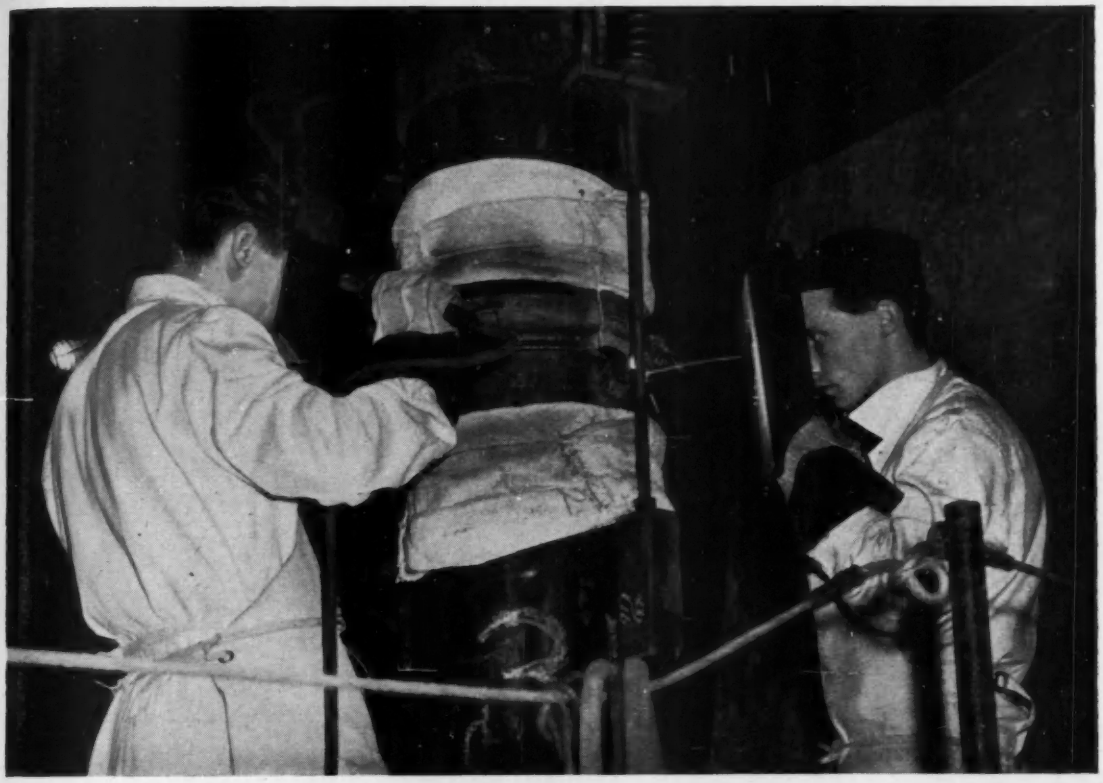

PROGRESS AT HIGH MARNHAM

200 MW reheat boiler units

Erection of the pressure parts is now well under way. The photograph shows the site welding of one of the downcomers, an integral part of the Controlled Circulation system adopted for these advanced units.

International Combustion have the experience and facilities which enable them to build steam generation plant, meeting the requirements both of the large power station and the industrial boilerhouse.

OPERATING CONDITIONS

Evaporation	1,400,000 pounds per hour
Steam pressure	2,450 p.s.i.g.
Superheat steam temperature	1,060°F
Reheat steam temperature	1,005°F

INTERNATIONAL COMBUSTION LIMITED

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Member of Atomic Power Constructions Limited. One of the five British Nuclear Energy Groups

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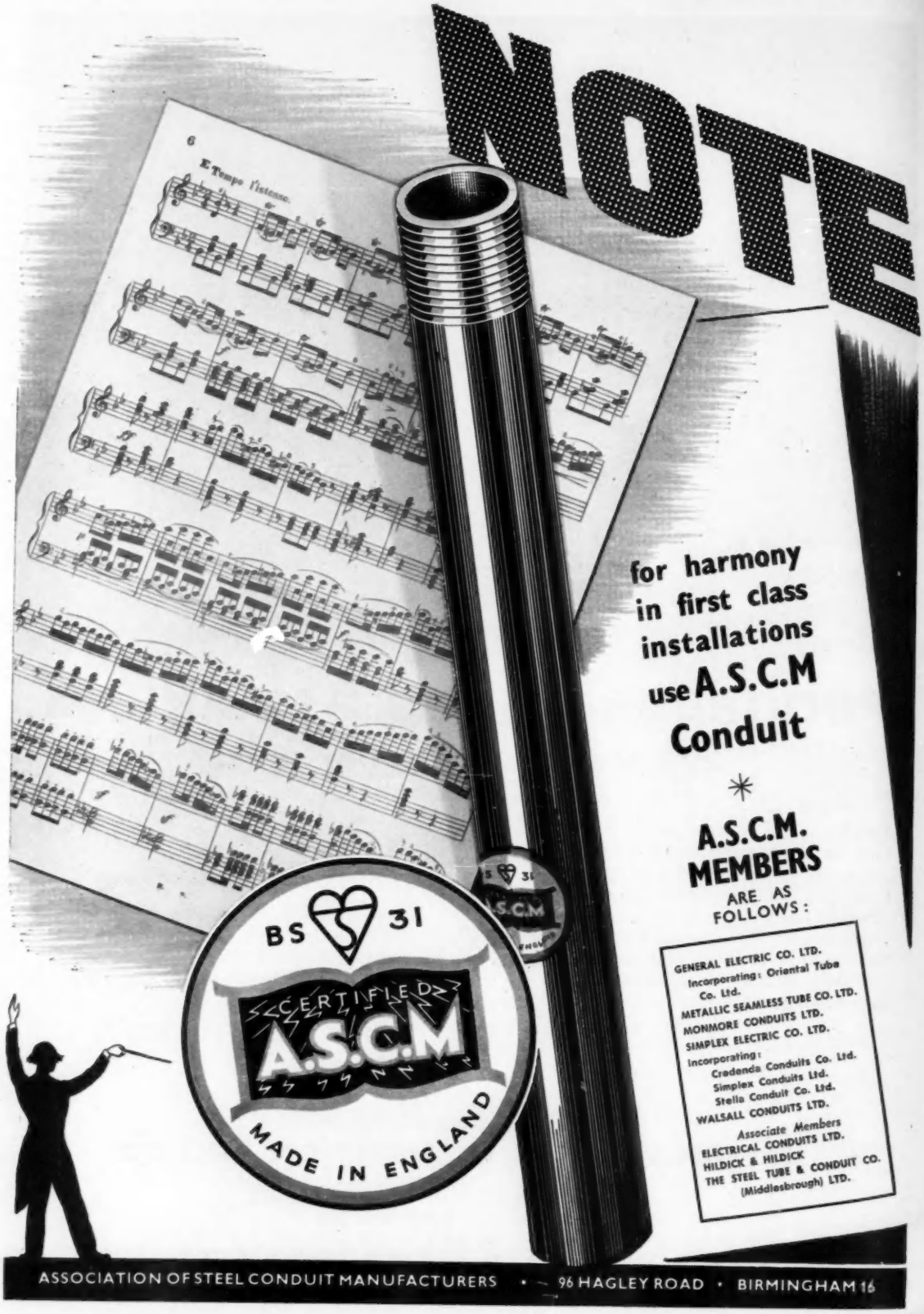
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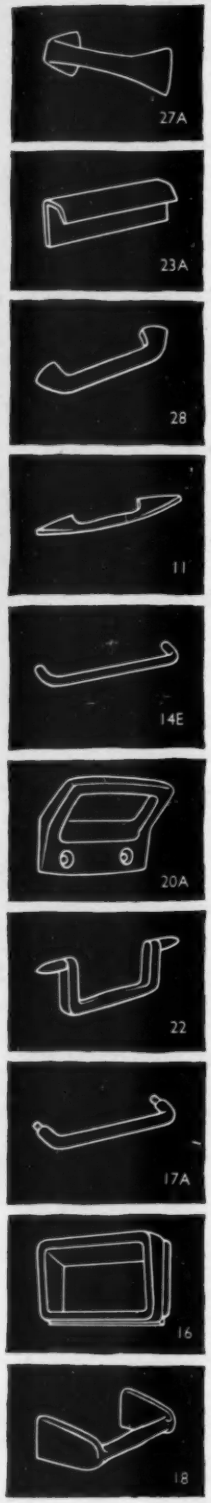

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In their extensive range of beautifully designed and finished handles, you will almost certainly find exactly what you want. Then you can order from stock and get delivery in days!

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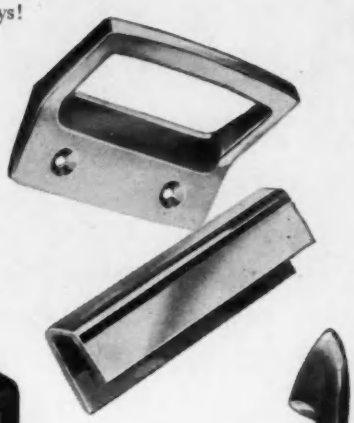
It pays to plan prototypes or production the Imhof way. Write for free catalogue.



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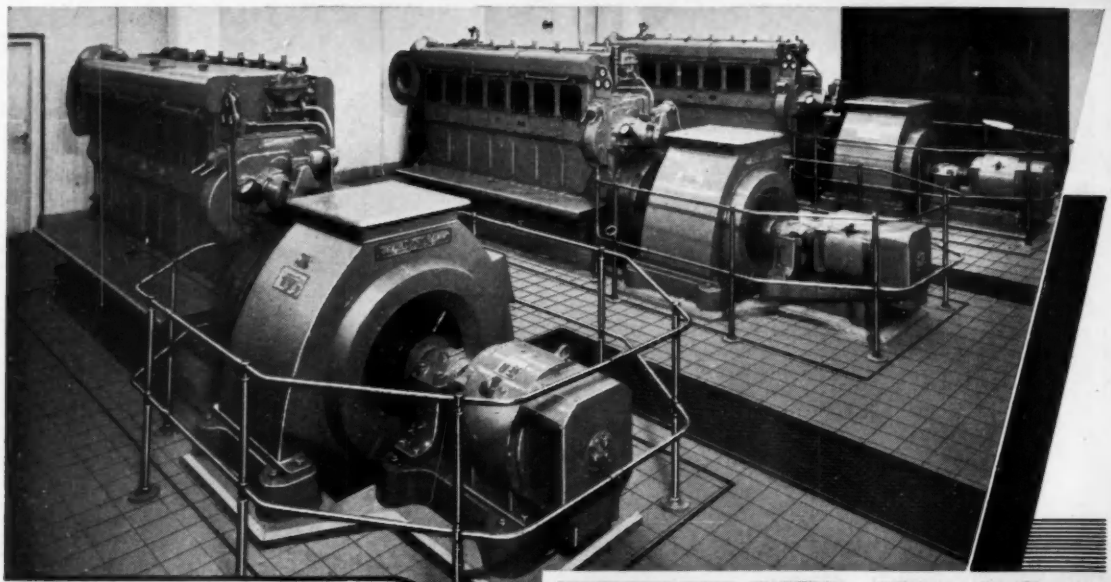


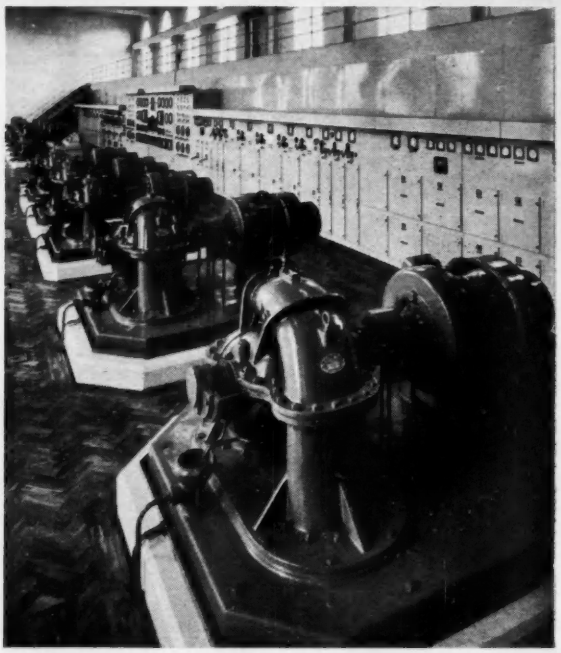
ALLEN

WATERWORKS EQUIPMENT

A complete installation of DIESEL GENERATING PLANT and ELECTRICALLY-driven PUMPS at the Pitsford Works of the Mid-Northamptonshire Water Board

The generating plant (above) comprises three 7-cylinder, 435-b.h.p., 600-r.p.m. Allen four-stroke, pressure-charged diesel engines driving 300-kW Allen alternators: the pumping plant (right) includes ten Allen single-stage, double-suction pumps of varying sizes and capacities, driven by Allen screen-protected, slip-ring motors — four 81-h.p., three 112-h.p. and three 140-h.p.

The total capacity of the ten pumping units is **45,000,000** gallons of water per day.



64 Allen pumping units have been installed for service in connection with the Pitsford waterworks scheme.

Engineer and Manager
L. H. Brown, Esq., B.Sc., M.I.C.E., M.I.W.E.

Specialists in complete Waterworks Pumping Plant installations

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BEDFORD ENGLAND

THEY SET A STANDARD

OVER 1500 years ago the Romans built the roads whose names are still familiar to us—Fosse Way, Watling Street, Icknield Way, Ermine Street and many others. Often following tracks old before the Romans came, these broad, straight roads provided vital communication for the legions, and for the administrators and merchants who followed in their steps. In road building, as in many other fields, the Romans set a standard which few have equalled since.

In cable making, too, standards are of vital importance. For over 100 years members of the Cable Makers Association have been concerned in all major advances in cable making. Together they spend over one million pounds a year on research and development. The knowledge gained is available to all members. This co-operation has contributed largely to the world-wide prestige that C.M.A. cables enjoy, and it has put Britain at the head of the world cable exporters.

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Roman legionaries on the march.

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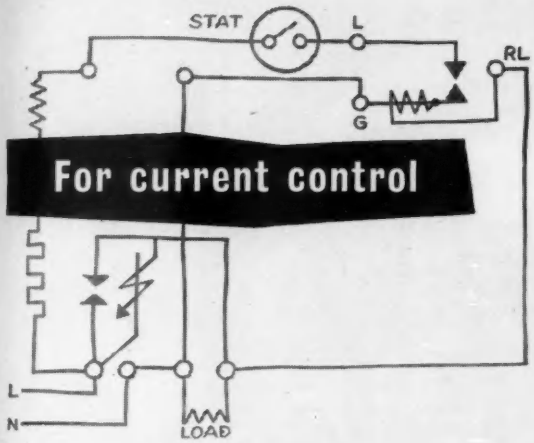
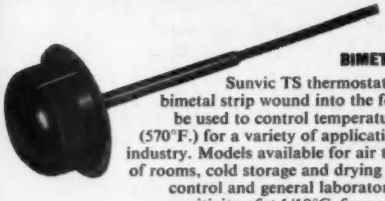


...SPECIFY SUNVIC

Sunvic components are widely used for controlling equipment such as moulding presses, furnaces, incubators, chemical plant, etc. Together with the Sunvic potentiometric recorder they also have numerous applications in scientific and industrial research particularly for measuring, controlling and recording temperature and small electrical quantities.

If you have a specific problem or would like technical information on any or all Sunvic components, please contact Sunvic Controls Ltd., P.O. Box 1, Harlow, Essex. Tel: Harlow 25271.



ADJUSTABLE BIMETAL THERMOSTATS

Sunvic TS thermostats are operated by a bimetal strip wound into the form of a helix. Can be used to control temperatures of up to 300°C. (570°F.) for a variety of applications in research and industry. Models available for air temperature control of rooms, cold storage and drying chambers, for oven control and general laboratory work, and with a sensitivity of ±1/10°C. for very accurate control.

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The Sunvic energy regulator effects its control by periodically switching on and off the power, the ratio of the on-time to the total time determining the average power input, which is continuously variable. Available in several forms with a continuous rating of 1kW at 230V. A.C.; also supplied with an HVS relay for larger loads.

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Available either as a loose tube for switching up to 10 kW at 400V. A.C. or D.C. or as a complete relay either enclosed in a plastic box or mounted on a paxolin base for incorporation in customer's own equipment. For single—or three-phase A.C. applications. Advantages are: no arcing; silent operation; low, non-inductive operating current; A.C. or D.C.; inductive or non-inductive loads.

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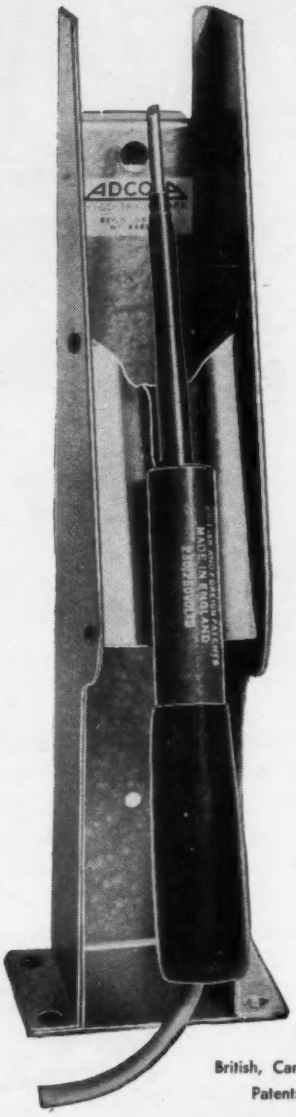

(illustrated)

⅛" DETACHABLE BIT TYPE

LIST No. 70

PROTECTIVE SHIELD

LIST No. 68

List No. 70 has been developed in particular for Solder jointing of Transistors.
It possesses the sharp heat necessary to make the joint in the minimum of time, thus avoiding damage to the transistor by heat transference.
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The instruments with the correct soldering temperatures

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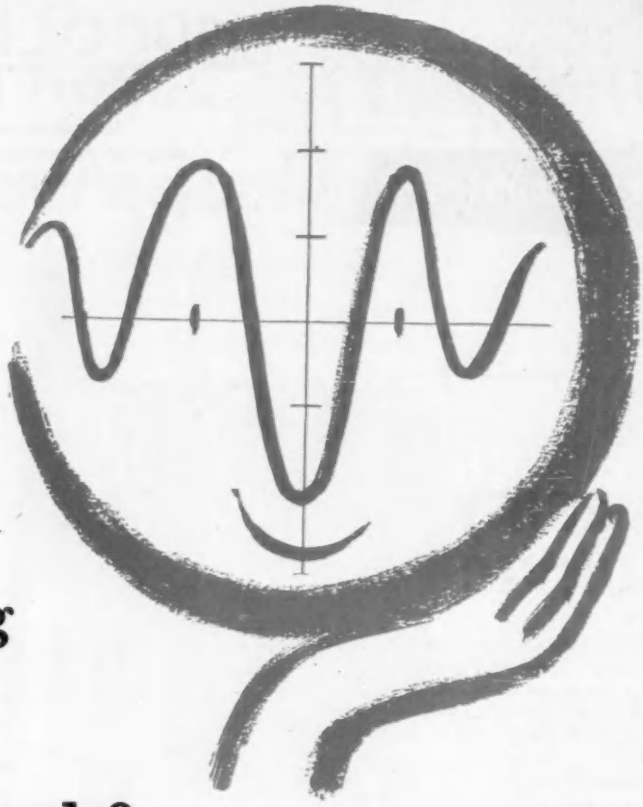

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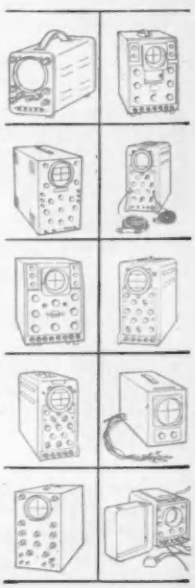
IN INDUSTRY? Diverse industries are finding solutions to their design and production difficulties with the aid of the Cathode Ray Oscillograph. Our Technical Advisory Service will be pleased to help you with your specific problem.

IN SPECIALISED FIELDS? Unusual types of oscillograph have been designed for specialised applications in the Hydraulic, Marine and Ultrasonic fields. We shall be pleased to consider specific development projects.



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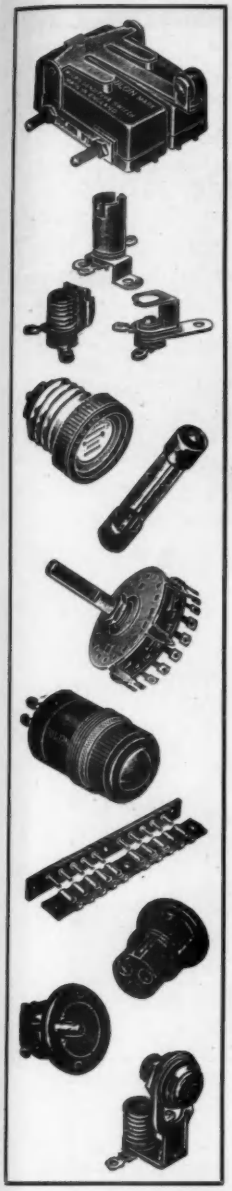

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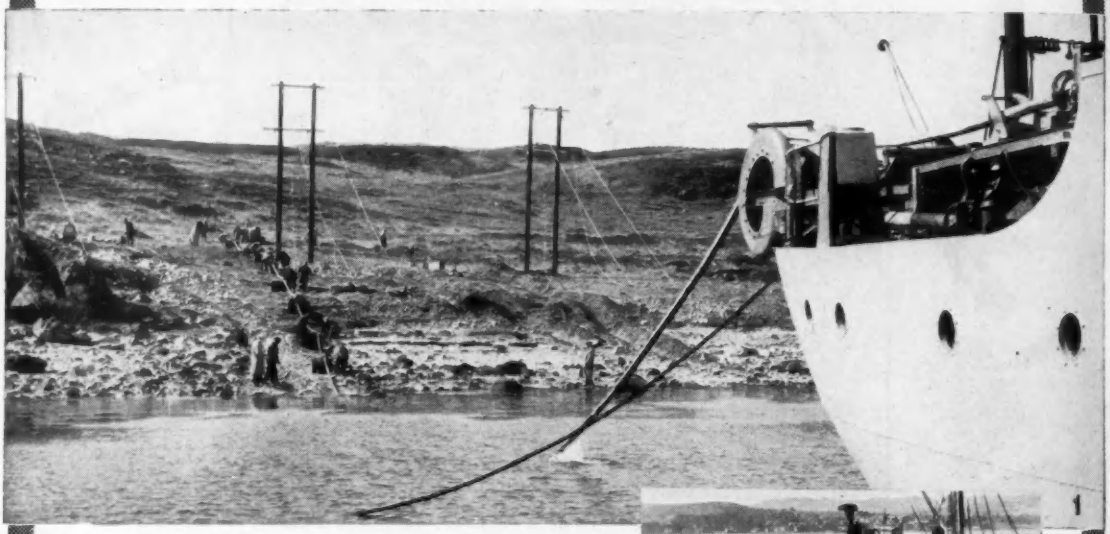

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1. *Loch Fyne: Landing one of the three cables with the overhead land line in the background.*
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3. *Loch Alsh: The shore end being hauled in by manual labour owing to the difficult terrain.*

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18 JULY 1958

ELECTRICAL REVIEW

Managing Editor: HUGH S. POCOCK, M.I.E.E. *General Editor:* J. H. COSENS *Technical Editor:* P. W. TUCKER, M.I.E.E.

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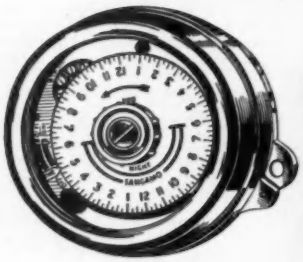

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ELECTRICAL REVIEW

18 July 1958 Vol. 163 No. 3 Established 1872

Inhibiting Corrosion

ALTHOUGH the principles of cathodic protection of metals from corrosion have long been known—their commercial application was suggested by Sir Humphry Davy about 150 years ago—their practical development has posed and still poses difficult problems. The chief and most complex of these arises from the straying of electric currents intended to be transmitted from artificially introduced anodes through the electrolyte of moist soil to the protected objects, which are caused to become cathodes of electro-chemical cells. Since the stray currents may damage nearby structures under different ownership, the conditions under which cathodic protection can be used without causing such interference clearly call for co-operation in investigations by the various bodies likely to be affected. This responsibility has been undertaken by the Joint Committee for Co-ordination of the Cathodic Protection of Buried Structures, which has issued the pamphlet reviewed in our issue of 20th June.

Although this document is admittedly not definitive, it contains much useful information and a number of suggestions which should enable some simpler, but none the less important, schemes to be put in hand. The value of cathodic protection is illustrated by the experience of the Post Office, which is reported to have obtained a considerable reduction in the number of telephone cable faults as a result of adopting the system in rural areas. Unfortunately, owing to the greater risk of interference, the method cannot at present be generally extended to cities, where the gain in improvement in service and saving in maintenance would be much more pronounced. There should also be a field of application in the preservation of metals in power stations, particularly of the nuclear variety, that are exposed to corrosion from salt water at coastal sites.

The alternative of bonding different structures to equalise electric potential, while successful in many instances, raises some questions as to possible results of earth faults on power supply mains and of the effect of the multiple earthing of neutrals. As to which of the two ways of applying cathodic protection, the "sacrificial anode" and the power-impressed systems, is best suited to individual cases, preference is usually to be accorded to the second on the grounds of lower costs and to the greater likelihood of equipment above ground receiving adequate attention.

Particulars given by Messrs. L. B. Hobgen, K. A. Spencer and P. S. Haselgrave in their I.E.E. paper last year (as reported by us on 15th March, 1957) indicate that the cost of protection usually forms but a small proportion of the total capital expenditure on new installations and could easily be recouped by saving in maintenance throughout their life. Since the yearly cost of corrosion in this country, as reflected in the replacement of existing pipelines, has been estimated at not less than £5 million, it would

appear that if interference can be substantially lessened the scope for cathodic protection will be vastly increased in view of the rapidly growing use of long pipelines in often unfavourable soils.

THE PRIVILEGE CASE

Last week's decision by the House of Commons, on a free vote, that a letter written by an M.P. to a Minister is not a "proceeding in Parliament" justified the London Electricity Board and its advisers in the action which gave rise to the controversy. At the same time the Board, wisely, has announced that it is not to continue with its intended libel action against Mr. G. R. Strauss but has asked the Minister of Power—who has agreed—to arrange for an independent inquiry to be held into the methods adopted by the Board for disposing of scrap cable, and allegations made regarding these matters. This is a satisfactory outcome to the particular case though clearly on the general subject of parliamentary procedure the House's decision has raised a number of complex problems.

As the *Economist* pointed out in a leading article before the debate, there are essential differences between depriving citizens of legal redress against allegations in M.P.'s letters and statements made on the floor of the House. In the latter case other Members will always expose any slander that may be uttered, whereas in letters to Ministers there is no similar check of publicity and disapproval. The time allowed for parliamentary questions is, however, limited and it has been suggested that the period should be extended by half-an-hour. It has also been proposed that a standing committee might be appointed to deal with matters affecting the day-to-day administration of the nationalised industries.

ELECTRICITY AND STEEL PRODUCTION

Probably the largest industrial user of electrical energy in this country is the steel industry and throughout the last few decades great strides have been made in steel production techniques largely as a result of the continued development of electrical machines and control gear. Electricity has afforded a flexibility in both control and operation of rolling mills impossible by any other method and has enabled production rates to be increased considerably. Over the years it has reduced the number of men necessary to operate plant and facilitated a high dimensional accuracy and consistent quality of the end product.

In this issue we publish a description of a new installation in the Ebbw Vale works of Richard Thomas & Baldwins, Ltd., which is a very good illustration of the application of electrical drives and control methods. The plant in question has a continuous galvanising line which has a potential output of about 10 tons an hour of either sheet or coil, and can handle strip up to 48in in width. This plant has been designed to operate continuously for periods up to thirteen weeks and apart from the electrical and mechanical maintenance crews, only six men are required to operate the complete production line plus one operator who is responsible for overall control.

"ELECTRICAL WHO'S WHO"

The fifth edition of the "Electrical Who's Who" is now available. Its nearly 8,000 entries cover all branches of the electrical industry and profession. Copies are obtainable at 27s 6d (postage 1s 6d) from Electrical Review Publications, Ltd., Dorset House, Stamford Street, London, S.E.1, or from booksellers

DEVELOPMENT IN CYPRUS

Through the vicissitudes of the past few years in Cyprus the work of extending the electricity supply network to cover the island has gone steadily ahead. In fact, the rate of development has been matched in few other places. Since 1952 output has risen from 20 million to 122 million kWh and, even more exceptional, it has been possible to reduce electricity charges. Although a great deal has been done in augmenting power supplies, the expansion of demand has been even more rapid and the Electricity Authority has had to review its plans more than once. The latest forecast is that the first part of a new power station should be in operation by the winter of 1960 and grid system extensions will also be required.

Capital resources already allocated to electrical development—the overall scheme is estimated to cost some £12½ million—cannot be increased, however, and the Authority says in its latest report that in these circumstances a drastic curtailment of the development programme is "inescapable." This is to be regretted, for the economic prosperity of the island is dependent on the provision of a comprehensive supply system. It is also disappointing to the Board which, under the chairmanship of Mr. H. F. Carpenter, has accomplished so much in the short period of its existence.

ELECTRICAL EMPLOYMENT

On the whole Ministry of Labour statistics relating to employment up to the end of April last show a fairly satisfactory position in the various branches of the electrical industry. The number employed in the electrical machinery section at the end of April, at 208,300, was 2·9 per cent greater than the end-April, 1957, figure. More were employed (6·2 per cent) in the radio valve and electric lamp industry, in the production of batteries and accumulators (4·3 per cent) and in the manufacture of "other electrical goods" (3·2 per cent). Reductions occurred in the cases of electric wires and cables (2·2 per cent), telegraph and telephone apparatus (0·3 per cent), and radio apparatus and gramophones (3·1 per cent). Taken as a whole the number employed in these sections totalled 717,600 against 707,900 at the end of April, 1957, representing an increase of 1·4 per cent.

The *Ministry of Labour Gazette* no longer shows separately employment in the electrical contracting industry. This figure is merged in a general heading "Building and Contracting." In this group employment declined from 9,065,700 in April, 1957, to 9,003,100 in April last, a decrease of 0·06 per cent.

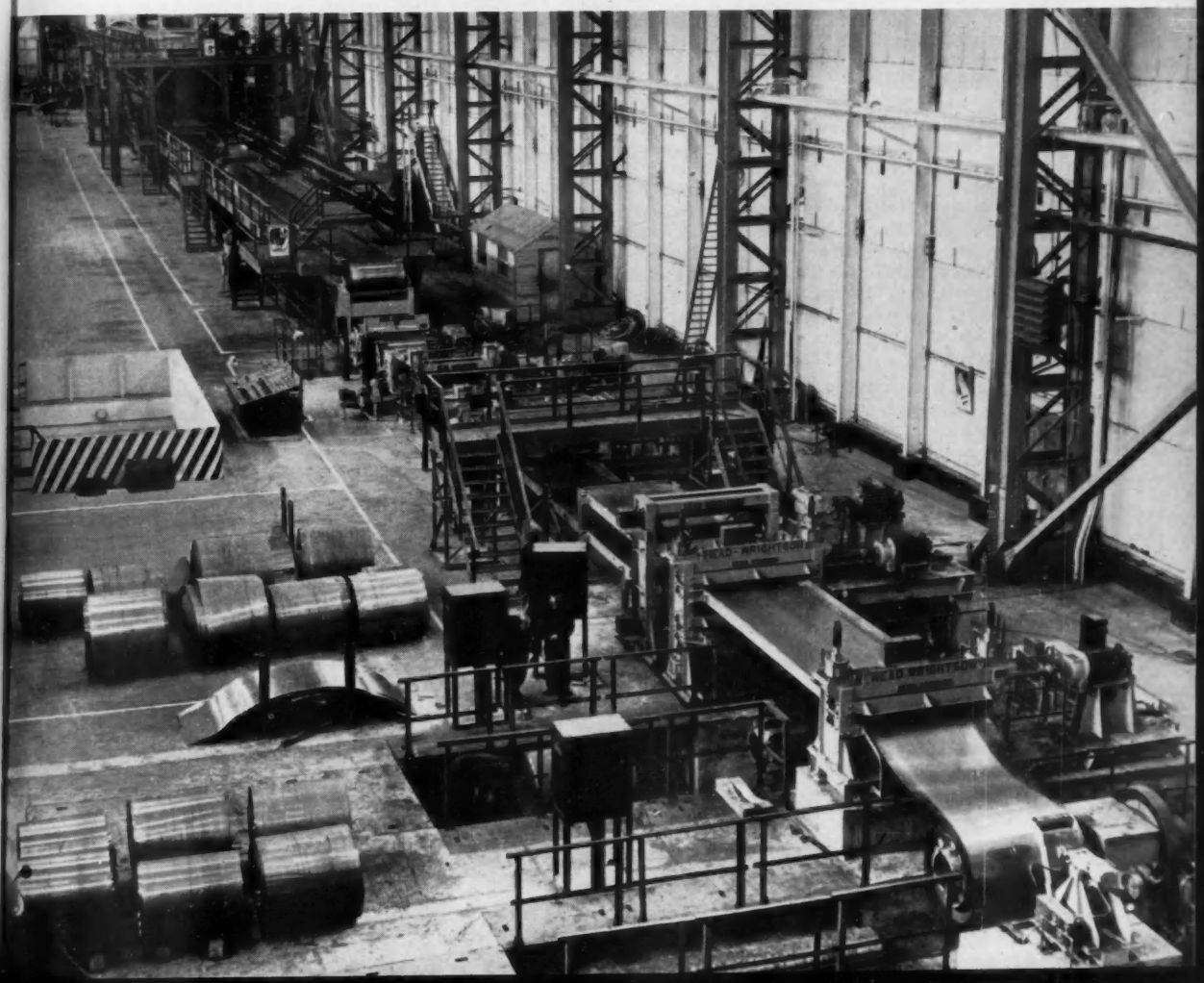
CONTINUOUS GALVANISING LINE

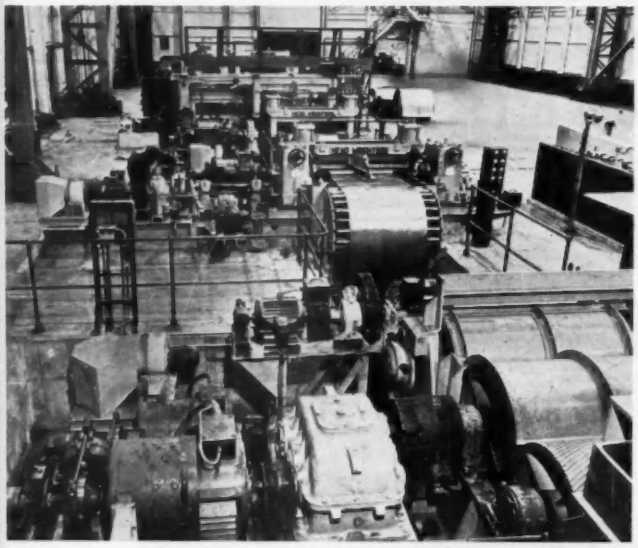
NEW PLANT INSTALLED BY RICHARD THOMAS & BALDWINS

EARLIER this year a new Armco Sendzimir continuous galvanising line went into operation at the Ebbw Vale Works of Richard Thomas & Baldwins, Ltd., to produce "Speltafast" galvanised sheet. This new line has a potential output of about 10 tons/hr of either sheet or coil, and can handle steel strip up to 48in wide.

The method of galvanising employed at Ebbw Vale is interesting because conventional methods, whereby steel sheets are treated in separate processes before being passed through a flux and a zinc bath, have several weaknesses, the main ones being brittleness and unevenness of coating, and the lack of ductility in the finished sheet. The Sendzimir process differs in that it is continuous and all the surface preparation, coating, and finishing take place on the one unit and the steel base is passed through in the form of strip. The aim is to overcome some of the known faults of traditional galvanising with methods of surface preparation and spelter composition that can be accurately and constantly controlled. This gives the metal fabricators a sheet the coating of which has an adherence sufficient to withstand drawing and forming operations, up to the limit of the steel base, without peeling or flaking. At the entry end of the 700ft long line, each mild steel coil is spot welded to the preceding coil. The strip enters the furnaces, where the surface is prepared for coating by two stages of heat treatment: first, by an open flame which cleans and lightly oxidises; second, by annealing in an inert

General view of the line from the entry end (north)





General view of entry section of line showing drive motors in the foreground

atmosphere and providing an oxide-free surface for coating.

After passing through a carefully controlled cooling chamber, the strip goes through the zinc bath, where the coating is controlled by rolls. The now galvanised strip travels vertically, allowing the molten coating to set, before passing through cooling blowers, and then under tension through a 2½in roller-leveller, before being coiled or cut up into sheets and inspected. Two long horizontal looping sections are provided in order that the strip may continue to pass through the furnaces when either the entry or exit section is stopped. Apart from the electrical and mechanical maintenance crews, the line is worked by six men, plus one operator responsible for overall control, on each shift. The main contractor for the plant was the Head Wrightson Machine Co., Ltd., the electrical equipment being supplied and installed by the English Electric Co., Ltd., and the furnace plant by Birlec, Ltd.

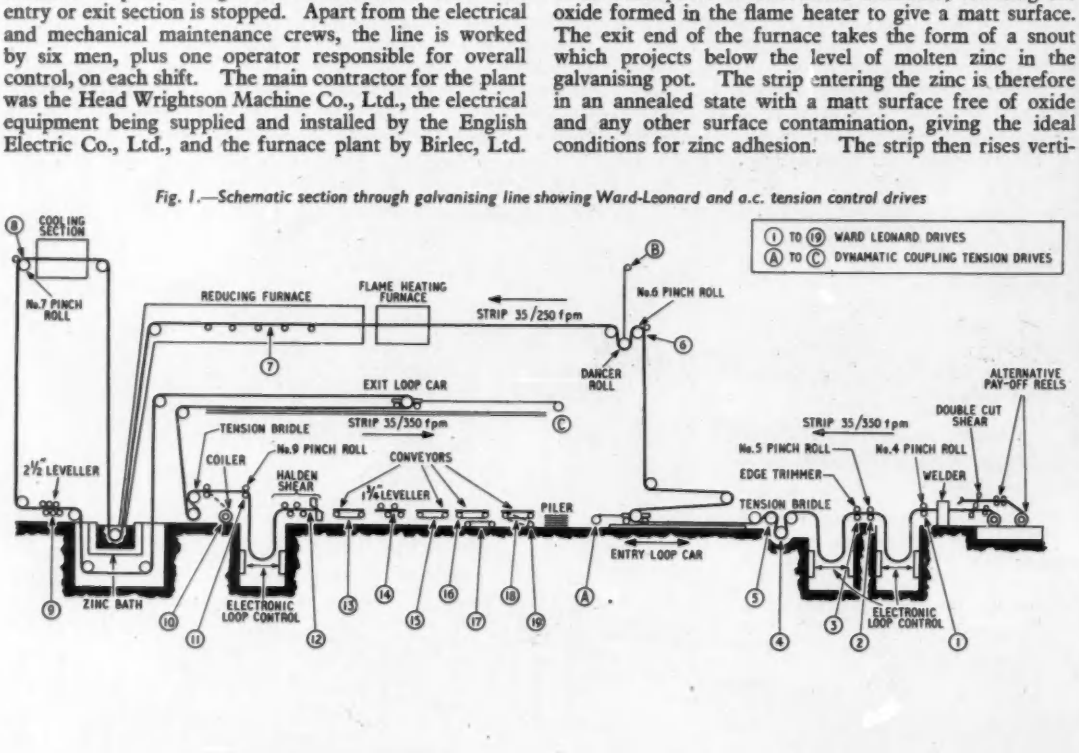
The Armco Sendzimir process has involved special consideration of the electrical plant, particularly in view of the necessity for maintaining the correct relationships of speed and tension at all stages during the process and to maintain continuity of production through long production runs. Fig. 1 shows a schematic section through the line with the various d.c. drives indicated. A considerable number of a.c. drives which are not shown are used to operate pumps, blowers, fans, etc., and to facilitate coil and strip handling during the threading process, and for various services.

Entry Section Operation

Coils of cold-rolled strip are loaded on to the expanding-drum type pay-off reel, which is adaptable for 20in, 24in and 30in bore coils, where back tension is applied by means of air-operated water-cooled brakes. Next, a.c. drives are used to thread the leading end of the coil through the shears to the welder where it is joined on to the tail end of the preceding strip. The strip is pulled off the pay-off reels by means of pinch roll No. 4 which feeds it into a looping pit. The strip is taken out of the pit by pinch roll No. 5 and passed through the side trimmer into a second looping pit, from whence it is taken round a tension bridle driven by two 30 h.p. forced ventilated d.c. motors which feeds it into the entry loop. This provides the accumulation of strip necessary to enable the main furnace section to continue operating while the entry section is stopped and started during coil changing.

The strip is pulled out of the entry loop by means of No. 6 pinch roll which feeds into a speed balancing loop. The latter serves to control the tension of the hot strip in the furnace by means of a weighted dancer roll. The strip then passes into the first section of the furnace, the flame heater, which serves to oxidise the surface of the strip and to burn off any contamination. From the flame heater the strip passes into the reducing furnace where it is taken through an annealing cycle of temperature in an atmosphere of dissociated ammonia, reducing the oxide formed in the flame heater to give a matt surface. The exit end of the furnace takes the form of a snout which projects below the level of molten zinc in the galvanising pot. The strip entering the zinc is therefore in an annealed state with a matt surface free of oxide and any other surface contamination, giving the ideal conditions for zinc adhesion. The strip then rises verti-

Fig. 1.—Schematic section through galvanising line showing Ward-Leonard and a.c. tension control drives



This view of the line shows the furnaces on the top platform and the delivery section at ground level

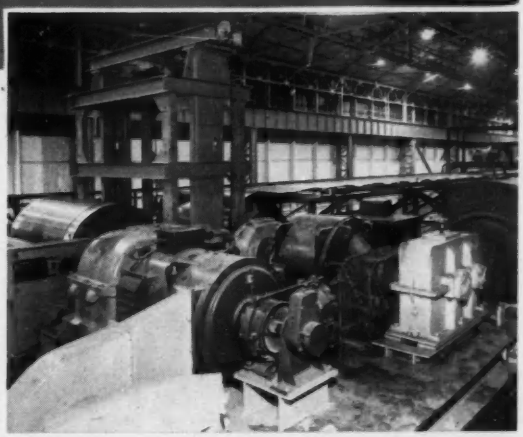
cally from the zinc pot to the final cooling section where cool air is directed over it to harden the zinc. After cooling, the strip passes through No. 7 pinch roll which controls the speed of the whole furnace section, and on to the 2½in leveller which gives the necessary degree of temper to the material. A similar horizontal loop to the entry loop separates the furnace and exit sections, allowing the furnace section to continue operating while the exit section is stopped and started. In the exit section the strip may be either coiled on the mandrel type coiler or sheared into sheets.

Strip for shearing passes first through No. 9 pinch roll which pulls the strip out of the horizontal exit loop and then to a small vertical loop which serves for speed balancing. Out of this loop the strip passes into a Halden flying shear and then a series of conveyors carry the sheared sheets to a further sheet leveller, classifier gate, for selecting primes or rejects, and then either by a prime conveyor and oiling machine to a prime piler or on a reject conveyor to the reject pile.

D.C. Drives

In all, a total of 19 Ward-Leonard d.c. drives are used. The line is divided into three sections, i.e. entry, furnace and exit sections, and the drives of each are speed matched, but the sections may vary with respect to each other by taking out or paying strip into either of the horizontal loops. With the exception of the classifier section, which handles sheets and requires less critical speed control, each Ward-Leonard drive is supplied from its own generator. The generators of each group have their fields supplied from a variable-voltage exciter in turn excited through a motorised rheostat which sets the section speed.

Special control facilities are included to suit the individual drives. The generator feeding No. 4 pinch roll has trimming by means of a modulated light control from photocells in the first looping pit arranged to main-



On the right is the 60 h.p. motor driving the "Dynamatic" coupling controlling the tension in the furnace section through a dancer roll. The 30 h.p. d.c. motor driving No. 6 pinch roll is on the left

tain the loop depth constant. A similar control is applied to the two tension bridle drives, these being controlled from the second looping pit. No. 6 pinch roll generator has a trimmer rheostat in its field which is controlled by the position of the dancer roll.

The speed of No. 7 pinch roll, on which the success of the process depends, is controlled by a magnetic amplifier which measures the difference between a set reference and the actual speed of the pinch roll, and adjusts the speed to reduce any error to the minimum. A similar control is applied to the 2½in leveller, but in this case regulation is introduced so that the tension between the two drives may be controlled.

The speed of the coiler is controlled by means of a magnetic amplifier acting in its motor field circuit. As the diameter of the coil increases so the speed of the strip tends to increase. This tendency is detected by means of a pilot exciter coupled to a pinch roll which causes the output of a magnetic amplifier to increase the field strength of the tension reel motor so preventing

more than a very small increase in strip speed. When shearing is being used the speed of No. 9 pinch roll is adjusted by modulated light control using photocells in the looping pit. The flying shear motor has field control to compensate for cut length changes.

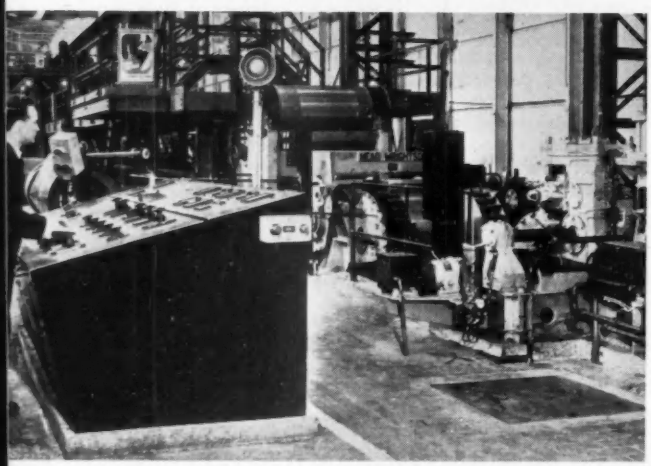
The remaining drives in the classifier section are fed from a common generator which gives speed matching to a sufficient accuracy while the separation of the sheets is controlled by the use of field trimmers provided for each of the classifier motors. To maintain the correct speed relationship between drives in all three sections and to ease the duty imposed on the automatic control systems, every drive has IR compensation acting through its generator and so giving a uniform regulation irrespective of Ward-Leonard voltage variation.

Main control room with a.c. control board on the left and d.c. control board on the right. In background are rectifiers on the left, magnetic amplifier and electronic boards with the d.c. switchboards on the right

Of the numerous a.c. drives, three are of particular interest, being used to control the tension in the entry and exit loops and in the dancer roll. In the case of the loops the strip passes round a roll on a loop car which is pulled towards a winch by means of a cable, the winch drive incorporating a "Dynamatic" magnetic slip coupling driven by a 60 h.p. a.c. motor.

The tension of the strip is proportional to the torque transmitted by the coupling which in turn is proportional to the torque delivered by the driving motor. The torque transmitted by the coupling is largely proportional to its excitation current but may vary under conditions of paying out and taking up of loop. To avoid the resulting variation in strip tension a servo control is included which compares the stator current of the driving motor with a chosen reference. Any error between these is amplified and used to excite the coupling in such a manner that the driving motor stator current and hence its torque, and the strip tension are held constant at the chosen value.

Entry section control desk. Behind is the No. 1 tension bridle and on the right the edge trimmer. Strip can be seen leaving the photo-electrically controlled loop between these units



The accompanying illustration shows a similar drive for the dancer roll with the 60 h.p. a.c. motor on the right driving the "Dynamatic" coupling in the centre through a gear reducer. The coupling drives the winch (almost hidden by the second gear box) so tensioning the rope which passes over the pulley at the top of the photograph to partially balance the dead weight of the dancer roll. The strip is seen on the left passing through No. 6 pinch roll driven by a 30 h.p. forced ventilated d.c. motor also on the left; after passing under the dancer roll the strip moves to the right along the roller table towards the furnace.

The photograph showing part of the control room, indicates the extent of the control gear needed for the 19 Ward-Leonard drives, 75 constant speed a.c. drives and the 900 kVA of the furnace resistance heaters. Some 300ft of flat-back control panels and switchboards together with magnetic amplifiers, electronic amplifiers and motorised rheostats are included with 750 kW of rectifiers for general service on the galvanising line. Full control of the line is provided by push-button and control switch operation on the four main desks, 22 control cabinets and numerous local push-button stations. The control desks and cabinets have stainless steel top and front sheets respectively, and are equipped with a loudspeaker system which provides intercommunication between various control points.

I.E.E. Meetings in North Lincolnshire

THE Council of the Institution of Electrical Engineers has approved the extension of the North Midland Centre to include North Lincolnshire. The Committee of the Sheffield Sub-Centre will be responsible for meetings in this area.

Fifty members of the Institution and a number of guests attended the first meeting in the area which was held at Brigg on 9th June, when it was decided that Mr. H. Peace, M.I.E.E., should act as convenor for meetings in the area and that he should have the assistance of two Grimsby members of the Institution, Mr. D. Curtis and Mr. A. Bridge, and two members from Scunthorpe, Mr. M. P. Rathbone and Mr. N. L. Evans.

In this article we give an account of the proceedings during the first part of the recent UNIPEDE congress at Lausanne. The eight papers discussed cover nuclear power stations, thermal generation, non-destructive methods for checking operational equipment, the use of targets for improving power station performance, modern steam power station construction and the study of pipework design by model tests. The remaining twenty-five papers will be discussed in next week's issue.

International Electricity Supply

THE 1958 UNIPEDE CONGRESS

FROM A CORRESPONDENT

THIS year's triennial congress of the International Union of Producers and Distributors of Electrical Energy (UNIPEDE) was held at Lausanne from 30th June to 3rd July. This body, which was founded in 1925, is an association of organisations that in each of the affiliated countries primarily represent the interests indicated in its title. It may be remembered that the 1955 congress was held in London.

The opening ceremony took place on Monday morning, 30th June, in the Palace of Beaulieu, a pavilion containing a cinema, halls, restaurants and all the other facilities necessary for a conference of this size. The presidential address was given by M. Aeschimann who is also the president of Union des Centrales Suisses d'Electricité. The most interesting of the points made during the opening speeches was probably the strongly-reasoned plea of M. de Rougemont that all Europe should unite in Euratom and not leave the work to the six countries so far committed.

Nuclear Power Stations

M. Ailleret, as chairman, introduced the work of the newly-formed Nuclear Power Stations Study Committee. Messrs. W. H. C. Pilling and G. T. Shepherd[1] (Great Britain) examined some of the more important problems of operating nuclear power stations.

With large gas-cooled reactors containing several thousand fuel elements, one of the major problems was to change the fuel whilst maintaining a high annual load factor. This involved the use of on-load fuel changing equipment. Not only was it necessary to change about three channels per day but it would almost certainly be essential to transpose fuel within the reactor to achieve a high average irradiation without some of the elements having to receive an excessively high burn-up. The importance of a high average irradiation for power producers was stressed and this should be compared with the relatively low irradiation necessary for the production of military grade plutonium. The design of on-load fuel changing equipment had posed many problems and it would be against all experience not to expect teething troubles.

A problem not yet fully solved was the fuel accountancy. It was clearly essential to know the irradiation undergone by any particular fuel element up to any required time. With a neutron flux varying over the reactor both axially and radially and nearly 50,000 fuel elements in a reactor, this was not easy. An appendix to the report showed a method of calculating these figures which appeared to be a great improvement on methods now in use.

Maintenance problems referred to by the authors included the major one of pressure vessel inspection. Such a vessel, in so far as gas-cooled reactors were concerned, could neither be hydraulically tested during service nor visually inspected. The main safeguard was manufacture and pre-commissioning inspection and testing to a very high standard and within very conservative limits. Nevertheless, a satisfactory method of routine testing and inspection was desirable and extensive provision for remote viewing was provided.

Nuclear Risk Insurance

In the unlikely event of a serious incident at a nuclear power station, the resulting escape of radioactivity would be no respecter of national sovereignty: it was quite conceivable that persons might suffer damage from an accident occurring in a neighbouring country. Although the chances of this happening were very remote, it was obvious that insurance against such risks should take this into account and that any national legislation should be within an agreed international framework.

This was the main point made by Signor Perolo[2] who went on to examine insurance against civil liability versus third parties. This was discussed under separate headings, the most difficult of solution perhaps being the questions of limitation of extent of liability and limitation of period of liabilty. The author seemed to feel that in both cases there was a danger of sentimentality overruling legal precedents.

Thermal Generation

The work of the Thermal Generation Study Committee was presented by the past chairman, Mr. G. R. Peterson.[3] Mr. Peterson, it will be remembered, was deputy chief engineer (operation) of the then Central Electricity Authority until he took up his present position as deputy chief executive, Federal Power Board, Salisbury, Southern Rhodesia, last year.

The first part of the report dealt with the progress made during the last three years in the study of pressing problems that had been discussed at the 1955 congress.

As far as Great Britain was concerned, the major development in the utilisation of power station ash had

been the setting up of a plant for making lightweight concrete aggregate from pulverised fuel ash at Battersea power station. This aggregate was formed by sintering the ash and was of good quality with approximately half the density of gravel. The process derived all or part of its heat from the carbon in the ash itself and it was a great advantage to pellet the ash so that the sintering mass could be kept permeable to air. It would appear that 2 to 3 per cent carbon in the ash was sufficient to maintain the sintering process in a vertical kiln although the absolute minimum carbon content had not yet been determined by practical trial. The plant referred to above had been erected by the Cementation Company, the venture being financed by the company which marketed the product under the name of "Terlite." It was clear that the sintering plant could be regarded as an extension of the power station, using carbon which would otherwise be wasted and converting the ash from a liability into an asset.

A further use for p.f. ash, of course, lay in the field of brick making and good bricks could be made by firing together p.f. ash and clay in the proportion 85 : 15 by volume. Bricks made by various processes from several different ashes and clays had now passed three winters in severe exposure tests and were judged amply good enough for normal exposure. There had been no effective move by the British brickmaking industry to apply these possibilities and the Central Electricity Generating Board was planning to set up a relatively small research plant at Hams Hall power station where p.f. ash production was now approaching 200,000 tons per annum. This plant could produce five million bricks a year and, if circumstances warranted it, it would be capable of being developed to produce 30 million bricks a year. It was understood that a Danish power station was also producing p.f. ash which was being used for the manufacture of lightweight concrete bricks.

Efforts were still being made to promote the use of p.f. ash as a substitute for part of the cement in conventional concrete. The C.E.G.B. was having p.f. ash incorporated wherever possible in power station constructional work, but such use could not absorb more than about 40,000 tons per annum. Other potential users were still reluctant to accept p.f. ash for their concrete. Some of the obstacles were technical in character and would be removed only by further test results and the formulation of standards. The fly-ash from one Danish station using travelling-grate stokers was being used as a raw material in the manufacture of cement.

The C.E.G.B. was carrying out surveys of dust pollution around 18 operating power stations. In all but two cases, the commissioning of a power station had not given any significant increase in the average level of dust deposit in the area within a two-mile radius of the power station. In the two cases where the dust deposit had increased investigation showed that the grit arresting plant was not operating satisfactorily. After putting this plant into correct working condition, the dust deposit returned to normal pre-commissioning amounts.

To obtain further information on the dispersion of dusts from power station chimneys, a technique had been developed in which balloons weighted to correspond to the free falling speeds of power station dusts were released up the chimney of a power station, and the distances they travelled observed. Such balloons had been returned from distances of 1½ to 110 miles away from the station from which they were emitted, thus showing the large amount of dispersion of fine dust.

Much further work had been carried out on surveys of sulphur dioxide around power stations and, although investigations were not yet complete, it was certain that power stations only contributed a minor percentage of total local pollution. Experience with gas-washing plants installed at Battersea, Bankside and Nottingham indicated a removal of over 95 per cent of the sulphur dioxide from the gases. A defect of all gas-washing processes was the cooling effect upon the discharged gas which, as a result, was cold enough to fall to ground level sometimes relatively near to the point of emission. Searches were continuing for a method of purification that would not cool the gas. Thermo-dynamic studies had been made of several chemical reactions which might conceivably be applied.

Further work had been carried out on the quick starting and quick loading of boilers and turbo-alternators. Quick starting in Britain was likely to become of increasing importance in the future with the probable need to run steam plant at peak load in association with nuclear base-load stations. It had been assumed that steam inlet temperatures should be limited to 100 deg F in excess of the first stage metal temperature. Results had shown that with differentials varying from 110 to 150 deg F for hot starts and 160 to 200 deg F for cool starts, good starting conditions had been obtained. Another previous assumption had been that the maximum rate of metal temperature change should be limited to 400 deg F/hr, but further tests had given rates of metal temperature increase of the order of 1,000 deg F/hr and it had been shown that such figures had been obtained during normal operation for several years. There seemed to be no reason why the figure of 400 deg F/hr could not be doubled in machines in the categories covered by the tests. Similar conclusions arose in regard to the previous assumption that temperature differentials between different parts of the same casing or in the same metal block should not exceed 150 deg F. It appeared that in normal operation differential temperatures of the order of 220 deg F for cool starts and 330 deg F for cold starts had occurred with no ill effect. Other previous assumptions appeared to have been correct.

Non-Destructive Methods for Checking Operational Equipment

M. Rath[4] (France) reported first on the non-destructive methods available including X-ray testing, γ-ray testing, ultrasonic vibrations, magnetic and electric methods and other methods such as dye penetrants, metallography on replicas, measurement of stresses by photo-electric and cracking varnishes and metrology. M. Rath went on to describe the testing of riveted drums in boilers, valve fittings and the investigation of corrosion in evaporator tubes. Non-destructive testing was also useful for the examination of cracking in austenitic and ferritic-austenitic welds of superheater tubes and steam piping. Cracks due to stress corrosion or corrosion fatigue might arise in superheater headers, desuperheaters, etc., at locations where condensed steam came into contact periodically with metal subjected to high temperature. These cracks were particularly dangerous, since they were very fine and difficult to see, and this was an application particularly suited to non-destructive testing.

Turbo-alternators also required non-destructive testing methods to be applied. First, there was the checking of the growth of foundry flaws in inlet nozzles and turbine casings. Secondly, checking the creep resistance of nozzle boxes, the examination of welded rotors and examination of blading. Thirdly, there was the important work in investigating cracking in generator end bells.

The prevailing development of larger and larger units

working under difficult conditions increased the chance of accidents and made their consequences more serious. Only by taking advantage of all resources of non-destructive methods and by the closest co-operation with the manufacturer whose main aim should be to design equipment capable of easy examination not only during manufacture or erection but throughout its working life, could this be achieved.

Use of Targets for Improving Power Station Performance

Mr. W. L. Parkinson[5] (Great Britain) introduced a paper on performance targets for thermal power stations. He pointed out that, in a large system, the obligation to the consumers was to minimise production costs rather than to use the minimum amount of fuel. Obviously, however, it was necessary to operate all plant at the highest efficiency obtainable within the various limitations which applied. The direct responsibility for ensuring that the plant was operated as efficiently as possible under the conditions which applied had to rest with the station operating staff. On the other hand, it was desirable from time to time to review the performance of each station and to compare this with some optimum performance in order to assess the efficiency with which the station was being operated. Such comparisons might be made in several ways and might serve to focus attention on avoidable losses which, if reduced, would increase the overall economy of generation.

Various methods had been proposed in Great Britain from time to time during the last thirty years for the determination of the optimum performance of a station with a view to enabling a comparison to be made with the actual operating results, but only two methods had so far been adopted on a national scale. The first of these was a simplified form of a method proposed by Biles and Maxfield and had been in use since 1946. The major disadvantage of the method was that it did not identify the reasons for departure from optimum performance nor provide any indication of the additional costs involved.

Attempts had therefore been made to develop alternative schemes which would give more useful results and a method based on statistical analysis of actual operating results had been in use in Great Britain for the last three years. This system had been devised by Mr. E. T. A. Emery of the C.E.G.B. and involved the determination of certain expected standards of performance which were derived from a statistical analysis of the actual operating results of a large number of stations and an assessment of the effects of the many variables on station performance.

Modern Views on the Constructional Design of Steam Power Stations

The various factors that affect the constructional design of power stations were discussed by Prof. Dr.-Ing. L. Musil[6] (Austria) together with a brief description of post-war development. These factors were mainly the block unit arrangement, the moving of auxiliary plant as close as possible to the turbo-alternator, the development of the central control room, the double-block unit which accommodated these principles and also allowed of cross-connection and, perhaps most important, the desire to build power stations more cheaply.

The different possible ways of achieving economic building construction were discussed, these being mainly the combination of boiler and building framework and, finally, the outdoor boiler. In the case of the turbo-alternator, the classical indoor arrangement had so far been retained in Europe due to climatic conditions. Here the attempt was being made to economise by suitable selection of building materials and by more economic use of lifting gear. An example of the latter principle was the reduction of turbine room crane capacity so as not to include stator handling facilities.

Finally, by using three modern examples of construction, viz. a coal-fired station, an oil-fired auxiliary winter station, and an American semi-outdoor installation, the practical applications of the various alternatives were illustrated.

Statistics of Heating Supply Schemes

The statistics were presented by M. A. Guichemerre[7] (France) and consisted of the essential basic data referring to district heating schemes throughout the world. Only schemes employing heat distribution systems laid under the streets were considered and the main purpose was to document the principal characteristics for the benefit of specialists in this field.

Study of Pipework Design by Model Tests

M. M. Snoeck[8] (Belgium) reported upon a contribution to the study of layout design of pipework, subjected to restricted thermal expansion, by means of tests on small-scale models. Drawing upon what had already been done in other countries, a Belgian Commission had developed a small-scale test rig which made it possible to ascertain in a practical way the stresses and couples at the pipework extremities.

The measuring head consisted of a six-ended spider connected to a fixed housing through twelve pointers. The measurements were made by successive replacement of all the forces transmitted to the pointers by forces which could be directly measured by weighing. The scale chosen for the model was about 1/20 full-size. This facilitated the construction of models reproducing as exactly as possible the pipework installation being designed. It was also decided to choose tubes rather than rods so that the model might be a true representation and so that bends and branches did not give rise to local phenomena which did not correspond to reality: e.g. deformation of sections which would occur if plain rods were used. The applications of equations of similarity and an account of practical results concluded the report.

(To be concluded.)

LIST OF REPORTS

NUCLEAR POWER STATIONS

[1] Operation and maintenance of nuclear power stations, by W. H. C. Pilling and G. T. Shepherd (Great Britain).
[2] Nuclear risk insurance, by Mario Perolo (Italy).

THERMAL GENERATION

[3] General report of the Committee.
[4] The application of non-destructive methods for checking operational equipment in thermal power stations, by Robert Rath (France).
[5] The use of targets for improving power station performance, by W. L. Parkinson (Great Britain).
[6] Modern views on the constructional design of steam power stations, by Ludwig Musil (Austria).

REPORTS PRESENTED UNDER THE AUSPICES OF THE INTERNATIONAL UNION OF HEAT DISTRIBUTORS (UNICHAL)

[7] Statistics of heating supply schemes, by André Guichemerre (France).
[8] Contribution to the study of layout design of pipework subjected to restricted thermal expansion by means of tests on small-scale models, by Marcel Snoeck (Belgium).

Royal Society of Arts Bursaries

The Royal Society of Arts has issued a booklet giving particulars of its industrial art bursaries competition for 1958. This gives conditions of entry, awards offered, method of selection, a time-table for entries, the names of the members of the juries and a list of subscribers to the competition.

CABMA REGISTER

THE "CABMA Register 1958-59 of British Industrial Products for Canada," published jointly by Kelly's Directories, Ltd., and Iliffe & Sons, Ltd., for the Canadian Association of British Manufacturers and Agencies, is now available from Iliffe & Sons, Ltd., Dorset House, Stamford Street, London, S.E.1, price 15s post free.

Sir William Rootes, chairman of the Dollar Exports Council, says in his foreword to the sixth edition of the CABMA Register: "British exports to Canada in 1957 were a record—$550 million. This is no mean achievement but is nevertheless still only 9 per cent of Canada's total imports. Before the war our share was almost double this—17·6 per cent. We must get back to our pre-war share of the Canadian market, and then exceed it. The CABMA Register is a valuable guide and reference book of British industrial products for Canadian executives and purchasing agents."

In this edition emphasis has again been placed upon capital and industrial goods of British manufacture required by Canadian industry. All the information contained in previous editions has been brought up to date.

The Buyers' Guide lists alphabetically some 3,200 British products available to the Canadian market, with their suppliers given under each heading. The French equivalents of these headings are set out in alphabetical order in a separate glossary. A directory of nearly 4,000 British firms gives details of their distribution arrangements in Canada, and further information about some of these firms and the products they supply is given in another section. Proprietary names and trade marks are given in special sections.

The Register is the Canadian buyers' standard work of reference and the degree of completeness and efficiency attained by this edition has once again been made possible by the full co-operation of the following sponsoring organisations: the Dollar-Sterling Trade Council in Canada and, in the United Kingdom, the Dollar Exports Council, the Federation of British Industries, the National Union of Manufacturers and the Scottish Council (Development and Industry).

TELEPHONE PROGRESS

THE annual report of the Telecommunication Engineering and Manufacturing Association for 1957-58 states that while the total number of telephones in the world in 1957 at 110 million, showed an increase of 7·6 per cent in the year, the increase in the United Kingdom was only 4·9 per cent. Quoting from "The World's Telephones," published by the American Telephone & Telegraph Co., of New York, it says that London has more telephones than any other city outside the United States, and there has been an increase from 80 to 82 per cent of total telephones connected to automatic systems.

Dealing with the increased tariffs introduced by the Post Office, the report says that the higher charges had an untoward effect upon the demand for new telephones and had led to many cancellations. The proposals later in the year for extending the unit fee area as a first step towards subscriber-to-subscriber dialling do not appear to have compensated for the increased tariffs and higher installation charges. The Government cuts in estimates, accompanied by the increase in charges and the provision for more capital investment out of profits, make it clear that the Post Office is suffering a double squeeze in the fight against inflation. It is urged that this is inequitable, and that the Chancellor of the Exchequer should give the Post Office some relief.

Reviewing the Post Office accounts for 1956-57, the report says that the number of applications for telephone connections during the year was 388,000, and the number of applicants outstanding was 246,000. At the time the report went to press the number of applicants had been reduced to 177,000.

Reference is made to the new transatlantic cable, the increases in long distance international traffic and international telex traffic, and the important part which electronic telecommunication equipment is playing in the modernisation of British Railways and in coal mines.

Exports of telephone and telegraph equipment in 1957 totalled £25·9 million, an increase of 17·9 per cent.

Kent Agricultural Show

ONE of the largest trade stands, and certainly one of the most attractive, at the Kent County Agricultural Show held last week at Mote Park, Maidstone, was that of the South Eastern Electricity Board. Designed and erected by the Board's own staff, it had as its theme "Electricity—a Power of Help," the accent being on the atomic age. This was supported by a model of Calder Hall power station summounted by a giant "atom." Continuing this theme, there were, placed alongside, five "Perspex" spheres each of which contained a model relating to the uses of electricity on the farm. An all-electric dairy and milking-parlour, a pig creep, a greenhouse with propagating benches, platform grain dryers, and milking and mixing machines, were among the subjects chosen.

Another outside section demonstrated electric lawnmowers, tillers, etc., and the portable "Brimpex" self-actuating lifter or hoist. The model on show was capable of lifting loads weighing up to 2½ cwt to a height of 5ft at the rate of 8-10 lifts per minute.

There was also an excellent display of dairy equipment, which included sterilising equipment and water heaters and the Simplex hygienic milker, while in the farm section crop drying, milling and mixing, and grain handling equipment were featured. Another well set out exhibit was the poultry section, in which could be seen the Stephen's "Electric Hen," a 25-chick size incubator, complete with live chicks. Egg cleaning machines, a poultry plucker, and Philip's and B.T.H. infra-red equipment were also shown.

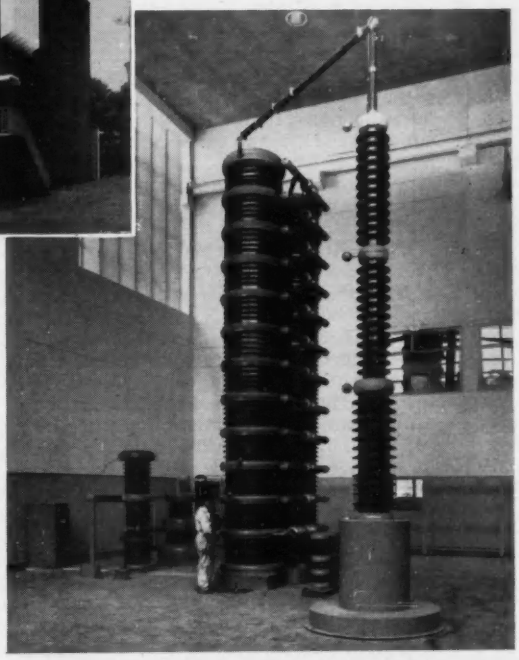
The nurseryman and amateur grower were able to find many electrical items of interest displayed in the horticultural section, ranging from a selection of Tarpen hedge-trimmers, grass cutters, and chain-saws to greenhouse heaters and sterilisers. Of special interest in this section was the "Electronic Leaf" mist propagation unit, a device to speed up the rooting of plant cuttings.

As in previous years the domestic display was of a very high standard and continuous demonstrations of almost all the leading makes of laundry equipment, cookers, food-mixers, dish-washers, ironing machines, floor cleaning machines, etc., were staged.

During the period of the show members of the Board's staff in attendance at the stand made practical use of an audio frequency staff location system. The equipment, loaned by Siemens Edison Swan Co., Ltd., proved to be of great value and inquiries regarding its use on large farms were received.

Part of the display of the South Eastern Electricity Board at the Kent Agricultural Show

SIR HENRY SELF OPENS NEW BUILDING FOR ENFIELD CABLES



2·4 MV impulse generator with 270 pF potential divider

HIGH-VOLTAGE TESTING LABORATORY

ON 10th July we were present at the Brimsdown works of Enfield Cables, Ltd., when Sir Henry Self, chairman of the Electricity Council, opened the new high-voltage laboratory which has been erected on the site. The test plant formerly used by the company was first installed in 1926 and has given good service throughout the years. Although it was improved from time to time, it could not adequately meet the changing and more exacting needs of the transmission systems which are now being adopted at home and abroad.

The new laboratory has been erected not only to provide the company with improved facilities for research and testing but also to provide a service to users of super-tension cables. The building consists of a main unit, the laboratory itself, to which all ancillary features are sub-ordinated. The laboratory has a floor area of 9,600 sq ft and 45ft clear height. Since the site is adjacent to the cooling towers and coal storage areas of Brimsdown power station, precautions had to be taken to ensure immunity from condensation, to prevent the infiltration of dust, and to provide satisfactory lighting and acoustic properties. A reinforced concrete frame is employed in the main structure, with the laboratory supported on 18in square columns at 15ft spacing. Pre-stressed concrete beams, 3ft 6in deep and with 7ft 6in spacing, span the 80ft roof.

Natural lighting is provided in the laboratory from a continuously glazed clerestory infilling on the north side supplemented by east and west windows, the latter having vertical louvres of pre-stressed concrete, excluding direct sunlight. To control the humidity and to exclude fly-ash and other impurities, a plenum system of air conditioning is provided. Heating for the remainder of the building is by conventional low-pressure central heating. Both systems are served through calorifiers by a steam supply from the main factory. The provision of adequate lighting at floor level presented an unusual problem, and the solution adopted was to install, at roof height, twelve 1,000 W mercury-tungsten lamps and reflectors. To improve the acoustic properties of the laboratory, acoustic absorbent material was introduced in the roof, using spattered vermiculite on metal lathing suspended below the beams. This, together with insulation boarding and a calculated area of acoustic tiling 12ft above floor level, has reduced the period of reverberation to 1·9 sec. It was not considered advisable to continue the absorbent materials to floor level, and so a hard wall tiled surface is provided to a height of 7ft. The tiled floor has been designed to withstand heavy weights and is non-dusting and oil-proof.

The main items of testing equipment in the laboratory include a 2·4 MV impulse generator, a high-voltage a.c. testing plant, and a pair of 1·5 metre diameter spheres for voltage measurement. The sphere gaps are motorised and arranged for remote control from the control room which overlooks the whole test area.

The impulse generator is a twelve-stage, two-column unit with an output voltage of 2·4 MV and a stored energy of 120 kW-sec. Shedded porcelains have been used for housing the stage capacitors and for the spacers. The front and tail resistances are adjusted to produce a $\frac{1}{50}$ μsec waveshape on the test specimen. Each stage capacitor has a capacity of 0·5 μF and is charged from

a d.c. charging equipment incorporating metal rectifiers so that a voltage of 0-200 kV d.c. can be obtained on each stage, the voltage being infinitely variable through the use of a moving coil regulator.

Facilities for automatic polarity change-over have been incorporated. By a simple rearrangement of the generator and replacement of the front resistances the fully stored energy can be utilised at 1·2 MV without dismantling the capacitors.

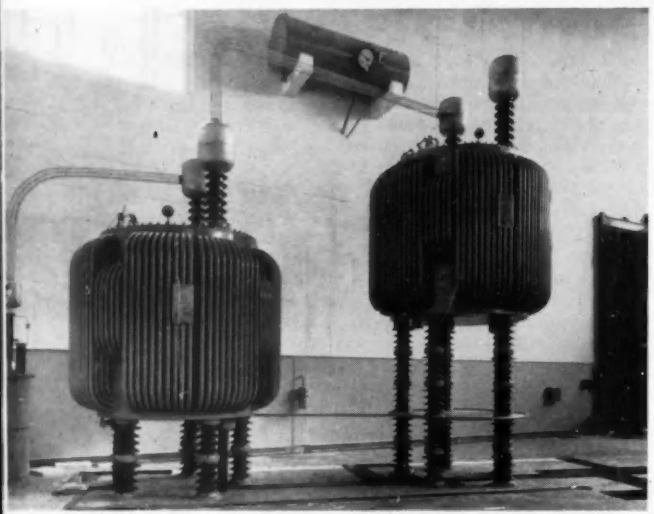
For voltage measurement a capacitance divider of 270 pF constructed in three sections has been used. This is terminated by a low-voltage capacitance of variable steps which is fully shielded and of low inductance. A low capacitance lead is taken from the divider to a cathode-ray oscillograph which is of the sealed-off type with tubes operating at approximately 15 kV. Two tubes are provided and also two cameras to permit photographic recording on both tubes. A common tripping circuit is used so that it is possible to obtain two independent records of the conditions in a circuit from a single applied impulse.

In the high-voltage a.c. testing plant, a series resonant circuit has been employed. A power supply is taken from the 11 kV system through circuit-breakers and a moving coil voltage regulator to a feed transformer of 400 kVA, 30 min rating. The secondary of the feed transformer is connected in series with the test sample and the two transformer/reactor units. Each of the transformer/reactor units is designed to operate at 300 kV on the secondary winding. With both units in series a voltage of 600 kV is obtained on the test sample with a rating of 2·4 MVA for 30 min or 1 MVA continuously. The reactance of each unit can be varied about 40 : 1 between maximum and minimum setting: the rating of the feed transformer permits the addition of a third transformer/reactor unit at a later date so that the ultimate output and capacity of the plant is 900 kV at 3·6 MVA, 30 min rating. A voltage-regulating unit has been incorporated and is operated from a capacity divider to allow for fluctuations in the test voltage arising from variations of both the supply voltage and frequency. This is especially important for a long-time stability test.

The series resonant circuit was chosen in preference to the conventional parallel resonant circuit because considerable improvement is obtained in the voltage waveform. This is desirable for accurate peak voltage measurement, and it assists in precision of balance with Schering bridge measurements on the test sample. Furthermore, should a test sample break down when the parallel resonant circuit is used, a considerable short circuit is developed across the fault and this would damage the sample. When the series resonant circuit is used a breakdown of the sample de-tunes the circuit and the fault current drops to a fraction of its normal value. This limits damage at the point of failure and assists in subsequent examination of the fault. Other reasons for choosing this arrangement are that the series resonant circuit is suitable either for series or parallel connection of the reactor/transformer units, and that the power for the test equipment is supplied at unity power factor.

Earth plates have been provided for both the a.c. testing plant and the impulse plant. On the impulse plant all earth connections are taken back to one common point. Considerable thought was given to the desirability of screening the building, but after discussion with many authorities it was decided that this was not necessary. The impulse generator and the high-voltage test plant were supplied by Ferranti, Ltd.

600 kV, 2·4 MVA series resonant transformer/reactor units with feed transformer



"Conquest of the Atom"

LAST week we saw a preview of the film "Conquest of the Atom" which was presented by Mullard, Ltd., and the Educational Foundation for Visual Aids. The film, produced by Realist Film Unit, is one of the series "History of Modern Science," intended both for direct teaching of pupils in secondary schools and to give them a sense of the methods of scientific discovery and the significance of modern scientific achievement.

The film begins with the opening of Calder Hall in October, 1956, then goes back to 1897 when J. J. Thomson was experimenting with discharge tubes in the Cavendish Laboratory. At that time the atom was believed to be a solid, indestructible sphere, the smallest particle of matter. The film shows how Thomson proved that the atom could be separated into electrons and positive particles. Next we saw a reconstruction of Rutherford's experiment which proved that the atom consisted of a central core, the nucleus, with one or more electrons circulating round it. Then in 1919 Rutherford split the nucleus, turning nitrogen into oxygen—the first artificial transmutation of one element into another.

In the next section of the film, Sir John Cockcroft explained how in 1932 he and his colleague, Dr. Walton, succeeded in splitting the lithium atom by proton bombardment. We subsequently saw how Sir James Chadwick in the same year discovered the neutron. The atom could then be visualised as consisting of a nucleus of protons and neutrons with electrons in orbit. But the neutron not only explained the structure of the atom; it also provided a new and powerful bullet for atom splitting. In 1938 Hahn and Strassmann split the uranium atom by neutron bombardment, and in this process of nuclear fission, energy was released. For each nucleus split, two or three neutrons were also released which, in turn, could split further nuclei; i.e., they produced a chain reaction. The film showed how in an atomic pile the chain reaction was controlled so that a continuous supply of energy was produced. In the final section it compared the simple, home-made equipment by which Thomson, Rutherford and Chadwick made their momentous discoveries with to-day's research equipment. It showed also that research into fission continued, but was also now concerned with "Zeta," an equipment designed not to split atoms but to fuse hydrogen atoms with helium at temperatures of over five million deg C, an emulation of how the sun produces its heat.

VIEWS on the NEWS

By REFLECTOR

A GREAT many people like to pay for their electricity or gas as they use it. That accounts for the continuing popularity of prepayment meters in spite of the fact that they add a bit to the cost. Electricity (and Gas) Boards would prefer their customers to accept quarterly bills but they have encountered some difficulty in persuading people to change from prepayment to ordinary meters. Electricity Boards have made it easier by instituting stamp schemes by which the necessary quarterly amount can be accumulated by easy stages. In view of all this I am surprised to learn from the *Western Independent* that the clerk to the Totnes Rural Council says that his Council's experience indicates that people would be glad to pay for their gas and electricity in bigger instalments than at present. He was referring to the Totnes Council's invitation to local residents to pay their rates annually instead of half-yearly. The reporter goes further in suggesting that possibly in the future, with joint meter reading and accounting, instead of four gas and four electricity bills a year there will be just two combined bills each year.

* * *

On the subject of electric heating, an editorial comment in the 30th June issue of the *Electrical World* (New York) is worth noting. Referring to a conference held earlier in the month, it sums up the conclusions as follows:—

"Electric heating and heat pumps—the keystones of the all-electric home—are the only way that we will ever break the 'kilowatt-hour barrier' and drive residential consumption upward to the levels about which we've been talking so loud and for so long.

"It is also the only way we're going to get the needed new revenues to support capital expenditures under conditions of constantly rising prices.

"All the evidence suggests—indeed, in some cases proves !—that an increasing number of utilities realise this. Consumption, revenue, and the cold, hard facts of electrical life (shifting peaks and dropping load factors) cannot be ignored.

"The time for delay is past. Every customer consideration, every long-range economic and possibly political condition is in our favour. Now—NOW—is the time for the electric industry to unite behind electric space heating and form the solid sales base from which it can launch into a more profitable tomorrow."

* * *

By chance I happened to notice that among the papers presented at the recent annual conference of the Institute of Sewage Purification was one by Mr. F. F. Ross, of the Central Electricity Generating Board, and the Institute has kindly sent me a copy. Mr. Ross, who is head of the Biological and Effluents Section of the Chief Engineer's Department, deals in the paper with the operation of thermal power stations in relation to streams, and brings to light a number of interesting facts. He shows, for instance, that cooling towers are good potential aerators though it is not easy to determine the effect quantitatively. Referring to the effect on water containing detergents, he says that sometimes the outfall from a station with cooling towers shows froth which, to the lay mind, appears to be pollution caused by the station. This is, in fact, the result of the purifying effect of the towers, destruction of the impurities in the water freeing the detergent to produce froth. Observations on fish life are also discussed, particularly the effect of increased water temperatures. Summing up, Mr. Ross says that the demand for ever bigger power stations cannot be met without exploitation of the cooling capacity of the water resources of the country. He emphasises that the effluents from power stations are not harmful, and states that the heat discharged does not appear to have such serious consequences as were feared a few years ago. The warm conditions might make it practicable to maintain a population of some of the fish prized by American anglers.

* * *

The most interesting item I came across in looking through the *Electrical Review* issue of 17th July, 1908, was an article by Sir Oliver Lodge on "Electricity in Agriculture." This described investigations, carried out at Bitton, near Bristol, into the effect of the electrification of the air on plant growth. Sir Oliver was asked if he could give advice on maintaining a continuous high-voltage discharge over a field, the power being furnished by an oil engine and dynamo. "I very willingly assented, and set my son, Mr. Lionel Lodge, upon the job," he wrote. The method adopted was to erect a number of wires across the field, spaced 102 yards apart, roughly one pole per acre being required. The description proceeded:

"The system of conductors is then connected at one post with a generator supplying positive electricity at a potential of something like a hundred thousand volts, and with sufficient power to maintain a constant supply of electricity at this kind of potential.

"Leakage immediately begins, and the charge fizzes off from the wires with a sound which is sometimes audible, and with a glow which is visible in the dark. Anyone walking about below the wires can sometimes feel the effect on the hair of the head, as of a cobweb on the face. They are then feeling the stimulating action of the electrification."

The results of the trials reproduced showed that, compared with the "control" field, there were increases of 30 to 40 per cent in wheat yield and similarly with other crops. There must have been some snag, however, for the idea does not seem to have caught on.

PERSONAL AND SOCIAL

News of Men and Women of the Industry

The Metropolitan-Vickers Electrical Co., Ltd., recently appointed **Mr. H. G. Bell,** M.Sc., M.I.E.E., as consulting engineer, Instrument and Meter Department, the appointment following Mr. Bell's retirement as chief engineer of the North Western Electricity Board.

Mr. H. G. Bell

Mr. Bell's early experience in engineering was with the Metropolitan - Vickers Co.; he received his technical education at Manchester College of Technology, and after military service in the 1914-18 war he joined the company as a college apprentice in 1919. Following his apprenticeship he was the company's liaison engineer to the Westinghouse Co. of Pittsburgh, after which he joined the Research Department and later transferred to the Instrument and Meter Department. In 1930 Mr. Bell joined the Central Electricity Board as technical engineer, N.W. England and N. Wales Area. He became chief engineer and manager, Stretford and District Electricity Board in 1946; manager, No. 1 (Manchester) Sub-Area, N.W.E.B. in 1948; and chief engineer, North Western Electricity Board in 1953. He was chairman of the North Western Centre of the Institution of Electrical Engineers for 1950-51, and has been a member of the Institution's Supply Section Committee since 1955.

The British Thomson-Houston Co., Ltd., announces that **Mr. W. J. Carfrae,** B.Sc.(Eng.), M.I.E.E., A.M.Amer.I.E.E., has been appointed assistant chief electrical engineer of the company. After studying for his diploma in electrical engineering at Heriot-Watt College, Edinburgh, Mr. Carfrae completed a three-year student apprenticeship with the B.T.H. Co. Since 1927 he has been associated with the design and development of turbo-driven alternators. In 1948 he was appointed manager of the Turbo-Generator Engineering Department, and in May last year became manager of the Turbine-Group Engineering Department with responsibility for the design engineering staffs engaged on steam turbines, turbo-generators, gas turbines, gears, and compressors.

Mr. W. J. Carfrae

Mr. Carfrae has been concerned with many important developments affecting electrical design and performance, including the first B.T.H. hydrogen cooled alternators, and hydrogen coolers, developed to meet the required conditions. He introduced the directly coupled double-bearing exciter with various forms of flexible drive and was instrumental in the introduction of the use of the "d.c. current transformer" for measurement of alternator field current. Mr. Carfrae also investigated conditions of exciter and slipring brushgear and instituted modified designs resulting in improved performance. In 1946 he visited the United States to study hydrogen cooling practice on alternators and in 1957 to study current steam turbine practice. In 1956 he was assigned to special duties in connection with turbine manufacture. Last year the Heriot-Watt College, Edinburgh, conferred on him the honour of a Fellowship.

Mr. R. B. Brock, M.B.E., F.R.I.C., B.Sc., of Townson & Mercer, Ltd., has been elected president of the Scientific Instrument Manufacturers' Association of Great Britain. Mr. Brock is well known to participants at international scientific and industrial exhibitions in Belgium, France, Germany, Switzerland, U.S.A., Australia, Canada, India, New Zealand, S. Africa, S. America, and many other parts of the world.

Mr. R. B. Brock

Mr. F. E. Rowland, M.I.E.E., M.I.B.A.E., M.A.S.A.E., has retired from the chairmanship of the board of the Simplex Dairy Equipment Co., Ltd.; **Mr. E. M. Bond-Smith,** deputy chairman and managing director, has been appointed chairman. Mr. Rowland was appointed chairman of the Simplex Dairy Equipment Co. in May last year when the activities of the Agricultural Department of the G.E.C. were transferred to that company and its associated company, Agricultural Supplies (Cambridge), Ltd., both of Cintra House, Cambridge. This followed the acquisition by the General Electric Co., Ltd., of a share interest in the Simplex group of companies.

Mr. Rowland joined the G.E.C. in 1918 and after training in the estimating and marine departments undertook the formation of an agricultural department in 1929. His services to agriculture, particularly in the field of electrical engineering, have received wide recognition. He is a member of the E.D.A. and E.R.A. Rural Electrification Committees and a former member of the I.E.E. Utilisation Section Committee. He is a past president of the Institute of British Agricultural Engineering.

Mr. T. J. R. Smith has been appointed sales manager of Hellermann, Ltd. He joined the staff eight years ago and was for most of that time a technical representative, covering London and the southern counties. Since the spring of last year he has been the manager of the Hellermann solderless connectors division at Crawley.

Mr. T. J. R. Smith

Mr. L. G. Bettinson, export manager of Berry's Electric, Ltd., has left for America on another selling drive. This will be undertaken as before in a ranch-wagon shooting brake. Starting from New York, Mr. Bettinson will drive to Canada, setting up hotel displays in Montreal, Toronto, Hamilton and Vancouver. Returning to the United States, he will mount similar displays in Chicago, Seattle, Portland, San Francisco, Los Angeles, San Diego, Dallas, Houston, New Orleans, Atlanta and Miami.

In our report last week of the luncheon of the **Electrical Industries Club** (p. 70) mention was made of the presentation of awards to the success-

Mr. E. G. Batt presenting the cup to Mr. E. A. Langsdon

Mr. J. I. Eernard presenting a cheque to Bristol, on his retirement from E.D.A. staff who were visiting "Electricity Farm"

Mr. E. J. Dowson at the Royal Show, With him are members of the E.D.A.

ful competitors in the recent E.I.C. golf tournament. We now reproduce a photograph of the winner, Mr. E. A. Langsdon (Ionlite, Ltd.), receiving the cup from Mr. E. G. Batt, vice-president of the Club.

Mr. A. Cheney has been appointed sales manager and **Mr. G. F. Henderson** assistant sales manager of Acheson Colloids, Ltd., a subsidiary of Acheson Industries (Europe), Ltd. **Mr. T. Wint,** who becomes sales engineer, will be responsible for the N.E. England territory and will operate from the company's Rochdale office.

Mr. Edward A. Smith has been promoted to the position of assistant manager, European operations, with the responsibility for all the various production units of Acheson Industries (Europe), Ltd., in Britain and the Continent.

Mr. W. A. Lishman, buyer for W. T. Henley's Telegraph Works Co., Ltd., since 1943, is retiring at the age of sixty-five. Mr. Lishman joined Henley's in 1907 and in 1957 he received a resolution from the board of directors, together with an appropriate award in recognition of his fifty years' service with the company. **Mr. L. H. J. Rivett** has been appointed buyer as from 1st August in succession to Mr. Lishman. He has held the position of assistant buyer since 1951. **Mr. O. R. Heath,** M.P.O.A., is chief assistant buyer.

Mr. L. H. J. Rivett

Mr. E. J. Dowson, who has resigned for health reasons from the Electrical Development Association after thirty years' service, was presented with a cheque from his colleagues on "Electricity Farm" during the recent Royal Show at Bristol. Mr. Dowson has represented the Association at agricultural shows on countless occasions, and as he was the E.D.A. area officer for the South Western and South Wales areas in pre-nationalisation days and continued to work in those areas afterwards, the West Country has been the focal point of his electrical activities. He has decided to spend his leisure years in Bristol. The presentation was made to him by Mr. J. I. Bernard, the Association's director and secretary.

London Transport announces that the titles of the officers in the Department of the Chief Mechanical Engineer (Railways) have been amended as follows:—**Mr. G. S. Bingham,** M.I.Mech.E., M.I.Loco.E., M.Inst.T., formerly assistant mechanical engineer (works—railways), becomes mechanical engineer (works—railways); **Mr. J. G. Bruce,** B.Sc.(Eng.), M.I.E.E., M.Inst.T., M.I.Loco.E., formerly assistant mechanical engineer (running—railways), becomes mechanical engineer (running—railways); **Mr. R. I. D. Arthurton,** B.Sc.(Eng.), A.M.I.Mech.E., A.M.Inst.T., M.I.Loco.E., formerly assistant mechanical engineer (development—railways), becomes mechanical engineer (development—railways); and **Mr. I. W. Standring,** A.M.I.E.E., assistant mechanical engineer (lifts and escalators), becomes mechanical engineer (lifts and escalators).

The annual **inter-company apprentice sports meeting** for apprentices from a number of firms mainly in West London districts was held on the evening of 9th July at the Hoover sports ground, Sudbury Avenue, North Wembley. Apprentices from the following companies took part:—A.E.C., Ltd.; British Thomson-Houston Co., Ltd.; Electric & Musical Industries, Ltd.; Handley Page, Ltd.; Hoover, Ltd.; S. Smith & Sons, Ltd.; Sperry Gyroscope Co., Ltd., and Standard Telephones & Cables, Ltd. The idea of an apprentices meeting was first proposed by the apprentices' association of Standard Telephones & Cables, Ltd., and their works manager, Mr. R. G. Helbing gave a trophy which has been competed for annually since 1953. Apprentices from Standard Telephones & Cables, Ltd., won the event this year.

Mr. J. R. Clarke, M.I.Mar.E., has been appointed technical officer with the Combustion Engineering Association. Mr. Clarke retired from the Royal Navy as a lieut.-commander in 1955 after thirty years' service in the Engineering Branch, and has since gained civil experience in the engineering industry. **Mr. A. Laird** assumes the appointment of senior technical officer.

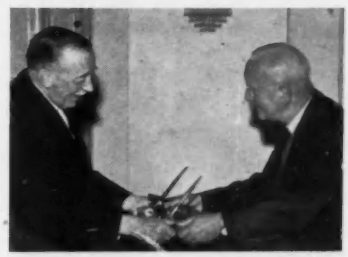
The Merseyside and North Wales Area Competition of the **Electrical Industries Golf Championship** will be held on 26th August at Prenton Golf Course, Birkenhead, Ches. Application forms can be obtained from Mr. S. R. Gee, 29, Hope Street, Liverpool, 1.

The London Graduate and Student Section of the **Institution of Electrical Engineers** has elected the following officers for the 1958-59 Session:—Chairman, Mr. J. F. Outram (Central Electricity Generating Board); vice-chairman, Mr. L. A. Harris, B.Sc.(Eng.) (Marconi's Wireless Telegraph Co., Ltd.); hon. secretary, Mr. F. P. Harwood (London Electricity Board).

Mr. R. J. Fothergill, B.Sc.(Dunelm), A.M.I.E.E., has joined the design staff of the Maxlume Division of Veritys, Ltd., and is based at the company's works in Birmingham. Mr. Fothergill, who is well known in lighting circles in the North of England, has for the past seven years been with the Lighting Service Bureau (now the British Lighting Council), and was previously with A. Reyrolle & Co., Ltd. He saw service in Egypt during the war.

Mr. R. J. Fothergill

As we have already reported, **Mr. Leslie Gamage,** M.C., chairman and managing director of the General Electric Co., Ltd., has retired from the presidency of the Institute of Export, and on 2nd July a luncheon was held by the Institute at the Connaught Rooms to pay tribute to Mr. Gamage and to welcome his successor in office, **Sir Charles Fitton,** O.B.E., M.C. At the luncheon, which was attended by many distinguished men, the toast of "The Institute of Export and its President, 1943-1958—Mr. Leslie Gamage" was proposed



Mr. Leslie Gamage receiving a desk stand from Sir Charles Fitton to mark his fifteen years of service to the Institute of Export

by Mr. Heathcoat Amory, M.P., Chancellor of the Exchequer, and seconded by Mr. Harold Wilson, O.B.E., M.P. After the luncheon Sir Charles Fitton presented Mr. Gamage with a desk stand to mark the Institute's recognition of his fifteen years' service.

A presentation, in appreciation of fifty years' service with Johnson & Phillips, Ltd., was made to **Mr. H. H. Smith,** foreman, on 8th July, when Mr. Glass, chairman of the company, handed to Mr. Smith a silver mounted leather wallet containing treasury notes, to mark the occasion.

Mr. J. Studholme, chief technical engineer of the Benjamin Electric, Ltd., left London by air on 10th July for Sweden to attend the International Electrotechnical Commission meeting in Stockholm.

The General Electric Co., Ltd., has opened a new branch office at Magnet House, Selinas Lane, Dagenham, Essex, under the managership of **Mr. S. E. R. Barker,** who for the past seven years has been with the London sales organisation. Previously he spent many years with the company in the West Country at Southampton and Plymouth. The new premises are designed to provide an improved service to the Essex and East London area which in the past has been served from Head Office, Kingsway, W.C.2. A full range of goods will be available along with trade counter facilities and a daily delivery service will operate to all parts of the area.

Mr. S. E. R. Barker

Mr. and Mrs. L. A. McGeoch, of Glasgow, celebrated their diamond wedding on 23rd June. Mr. McGeoch is chairman and managing director of William McGeoch & Co., Ltd., wholesale ironmongers, brassfounders and manufacturing electrical engineers, of Glasgow and Birmingham. During all his business life Mr. McGeoch has been keenly interested in the various associations connected with the ironmongery and electrical trades, and was at one time national president of the Ironmongers Federated Association, now the National Institute of Hardware. He is a founder member of the Glasgow and West of Scotland Ironmongers' Association, and has played a prominent part in the development of the Association. He has also been a member of the Electrical Wholesalers' Federation since its inception. The celebration took the form of a family luncheon party. Many congratulatory telegrams were received, including one from the Queen.

Mr. and Mrs. L. A. McGeoch

At the Great Yorkshire Show, Harrogate. Left to right: Mr. T. M. Ayres (chairman, North Eastern Electricity Board), Mr. W. K. Fleming (manager, Harrogate Sub-Area), Mr. E. Bates (chief commercial officer, N.E.E.B.), Col. E. G. Angus (member, N.E.E.B.), Mr. A. Haselhurst (chief commercial officer, Yorkshire Electricity Board), Mr. J. Hack (senior assistant engineer (rural development and farming), Y.E.B.), Mrs. Cameron Kirby and Mr. C. Cameron Kirby (manager No. 6 (Hull) Sub-Area, Y.E.B.)

Apprentices at the Willesden Works of the **British Thomson-Houston Co., Ltd.,** held their annual parents' day on 12th July when they were hosts to 250 visitors, amongst whom were many representatives from local technical colleges. After apprentice-conducted tours of the works and tea, the guests were welcomed by Mr. C. F. Humphreys, manager, Switchgear Engineering Department, who introduced Mr. H. E. Cox, manager of the company's Rugby Works.

Certificates and prizes were presented to the winners of the annual essay competition and Mr. I. H. Childs, apprentice supervisor, announced the results of internal examinations. Mr. P. J. Palmer presented the Association's gift of flowers to Mrs. Cox, who accompanied her husband, and the retiring chairman, Mr. D. E. Howard, concluded the afternoon with a vote of thanks to management and supervisors who had co-operated with the apprentices in the preparations for the day.

London Transport has announced the retirement of **Mr. John Collins,** B.Sc.(Eng.), who has been generating station superintendent at Lots Road since 1954. Mr. Collins served his engineering apprenticeship with John Brown & Co. (Clydebank), Ltd., and received his B.Sc.(Eng.) degree, with special distinction, from Glasgow University. After two years in the technical design office of John Brown & Co. (Clydebank) he joined the United States Shipping Board in London and was promoted later to assistant superintendent engineer. In 1922 he joined the technical staff of the L.C.C. Tramways in connection with the installation of new plant at Greenwich generating station. He was appointed resident engineer at Greenwich in 1940 and assistant electrical engineer (Greenwich) in 1947.

The June meeting of the **A.S.E.E. Golfing Society** was held at Moor Park. The winner of the St. Helens (Saints) trophy was Mr. J. A. Gibson, after a tie with Mr. R. H. Hankinson. The winner of the Founders Mug was Mr. H. Lockett and the runner-up was Mr. P. E. Waygood.

Mr. J. P. H. Read, chief engineer—machines, of the Electric Construction Co., Ltd., has retired and he was recently the guest of honour at a complimentary dinner given by the members of the staff of the Machine Design Department, at which he was presented with an inscribed gold wrist watch by the managing director, Mr. J. C. Milne, and inscribed cuff links by the members of his department. Mr. Read has taken up residence in Cornwall where he has family interests.

Mr. A. Watkins

Mr. A. Watkins, A.M.Brit.I.R.E., becomes technical manager—machines, being responsible for machine design, both electrical and mechanical. He returned to the E.C.C. in 1945 following six years' war service (three years of which were spent in R.E.M.E.) to spend four years in combined mechanical and electrical design of a.c. and d.c. machines. He was appointed engineer in charge of

the company's new Electronics Department in 1949, becoming chief electronics engineer in 1954. He combined this office with that of assistant to Mr. Read on machine design.

As we briefly reported in our 27th June issue, **Mr. R. M. I. Hobill** has been appointed manager of the Transformer Department of Ferranti, Ltd., in succession to **Mr. J. E. L. Robinson,** who has become an executive director of Associated Engineering, Ltd.

Mr. Hobill joined Ferranti, Ltd., from Armstrong Whitworth in 1929, serving in the transformer drawing office, supervision of outside erection both home and overseas, and technical sales until 1940 when he was appointed transformer works manager. In 1946 he was appointed sales manager, London area, and in 1951 sales manager, Transformer Department.

Mr. K. R. Midmer will succeed Mr. Hobill as sales manager of the Transformer Department. He joined Ferranti's in 1931, serving an apprenticeship until 1934 when he entered the Sales Department. In 1940 he joined the Technical Branch of the R.A.F. with Fighter Command, later Transport Command, leaving the Service as a squadron leader Tech.(E) in 1946. He then became transformer sales engineer in South West England, and in 1953 area manager, South West England.

Mr. R. M. I. Hobill

Mr. J. E. L. Robinson

In addition to the above appointments **Mr. W. G. Murdoch** has been promoted area manager, South West England, and **Mr. J. P. Newberry,** deputy area manager, London. Mr. Newberry also retains his present position as chief engineer, transformer sales.

Mr. W. W. Cooke, lighting representative with the south-east region of Philips Electrical, Ltd., retired at the end of June after completing nearly twenty-nine years' service with the company. He was recently entertained at a farewell luncheon when he was presented with a tape recorder by his colleagues on the regional staff.

The Midlands Branch of the **Electrical Trades Commercial Travellers' Association** held its annual car treasure hunt recently. The Branch chairman, Mr. S. E. LeMarechal, congratulated the winners and thanked Messrs. P. J. Kelsey, G. A. James and P. M. King for arranging the event. The prizes were presented by Mrs. LeMarechal.

OBITUARY

Mr. W. F. Bowling, Associate I.E.E., who for the past seven years had been in Australia working, first as chief structural designer to the Snowy Mountains River scheme and latterly with the N.S.W. State Electricity Commission, died in Sydney on 26th June.

Mr. Bowling served an apprenticeship at the Admiralty Dockyard, Pembroke, and received his technical education at Liverpool University. After a period with John I. Thornycroft & Co., Southampton, he joined the Pirelli-General Cable Works, Ltd., as structural designer, working on the grid system. From 1935 to 1939 he was chief structural designer with Blaw Knox, Ltd., and from 1939 to 1948 held a similar position with Riley & Neate, Ltd. He returned to Pirelli-General Cable Works, Ltd., in 1948 as chief structural designer, working on television link towers, v.h.f. experimental towers, etc., a position he held until going to Australia in 1951.

Mr. W. H. Williams, a former director of the General Electric Co., Ltd., and manager of its Osram Lamp Department until his retirement in 1954, died on 7th July. Mr. Williams joined the G.E.C. in 1916. He was closely connected with the Tungsten Lamp Association and later with the Electric Lamp Manufacturers' Association from its foundation in 1919. He served as chairman of various committees and as chairman of the Council in 1944-45 and from 1948 to 1950. He took an important part in the establishment of lamp factories in Commonwealth and overseas countries and visited many of the territories concerned. Mr. Williams was a past-president of the Electrical Trades' Commercial Travellers' Association.

Plutonium from Power Stations

In an adjournment debate in the House of Commons last Friday Mr. Arthur Palmer said that there were several objections to the use of nuclear power stations for the production of plutonium for military requirements. It was said that the additional operating cost would be very small, but he understood that it would be between £12 million and £15 million per year. He said that the most serious objection was that it would be difficult to obtain the true operating costs of the future nuclear stations, which might have an unfortunate effect on our export trade possibilities; in this connection he referred to the leading article in the *Electrical Review* of 27th June. With regard to the point that the Bradwell and Berkeley stations would be able to provide the required information he said that Hinkley Point would be a model plant, more modern than Bradwell or Berkeley, and it was likely to be capable of producing electricity at less than 0·5d/kWh if it were free to operate as a power station and not as a military explosives plant. In addition to losing valuable data on operating costs, we should lose a great deal of valuable technical experience for our engineers and scientists in the operation of nuclear power plants under conditions of commercial loading.

Replying for the Government, Sir Ian Horobin, Parliamentary Secretary, Ministry of Power, said that from the point of view of the civil programme only two financial elements were concerned and, in the broad sense, there were no technical issues. The additional capital cost, less than 1 per cent of the cost of the station, would not be a charge on the civil programme. He could not accept or deny the figures Mr. Palmer had given, but he might have slightly misunderstood the situation. The operating expenses were simply the difference between the initial cost of the fuel elements and the price at which the A.E.A. bought them back from the C.E.G.B. In the case of overseas contracts, all these elements had to be sent back here for processing so that all the purchaser was concerned with was the price at which he would sell them and the price he would buy them back.

Concluding the debate, Sir Ian Horobin said he would be sorry if the idea got abroad that we were making fundamental changes in these reactors, which would make them hybrids and no longer a perfectly genuine and economic way of producing electricity.

Prices of Materials

In the accompanying table we give the basis prices of the more important materials used in the electrical industry. The figures given are the selling prices and are those quoted on Tuesday last.

ALUMINIUM ingots	ton	£180 0s 0d
COPPER, H.C. Electro	ton	£197 5s 0d
Fire Refined 99·70%	ton	£196 0s 0d
Fire Refined 99·50%	ton	£195 0s 0d
COPPER Tubes	lb	1s 11½d
Sheet	ton	£224 5s 0d
H.C. wire and strip	ton	£245 5s 0d
LEAD, English	ton	£69 10s 0d
Foreign	ton	£68 0s 0d
MERCURY	flask	£78 0s 0d
TIN, block (English)	ton	£730 5s 0d
ZINC, G.O.B. Foreign	ton	£62 5s 0d
Electrolytic	ton	—
BRASS Tubes (solid drawn)	lb	1s 6½d
Sheet	ton	—
Wire	lb	2s 4½d
PHOSPHOR BRONZE Wire	lb	3s 8½d
PLATINUM	oz	£25 0s 0d
RUBBER, No. 1 R.S.S. spot	lb	24d-24½d

Mr. S. E. Goodall

Sir Hamish D. MacLaren

Mr. A. H. Mumford

Mr. E. Leete

Mr. J. M. Ferguson

Mr. R. J. Halsey

I.E.E. ELECTIONS

New President, Council Members and Section Officers

Mr. S. E. Goodall, M.Sc.(Eng.), F.Q.M.C., chief engineer of W. T. Henley's Telegraph Works Co., Ltd., has been elected President of the Institution of Electrical Engineers for the 1958-59 session.

Mr. Goodall was educated at Queen Mary College, University of London, where he obtained his B.Sc.(Eng.) degree with honours in 1924 and M.Sc.(Eng.) in 1928. From 1924 to 1928 he served in the Apparatus Department of Siemens Brothers & Co., Ltd., Woolwich, after which he was in the Research Department of the Metropolitan-Vickers Electrical Co., Ltd. His association with Henley's commenced in 1944 when he was appointed assistant chief engineer. In the following year he became deputy chief engineer and when Dr. P. Dunsheath relinquished the position of chief engineer to become consulting engineer to the company in 1946 Mr. Goodall was appointed to succeed him as chief engineer.

Mr. Goodall was chairman of the Supply Section of the Institution for 1950-51. He has served for two periods as a member of the Council and was elected a vice-president in 1953. He has been a member of the Institution's Wiring Regulations Committee since 1952 and was appointed vice-chairman last year.

To fill the two vacancies for vice-presidents, Sir Hamish D. MacLaren, K.B.E., C.B., D.F.C., LL.D., B.Sc. (Director of Electrical Engineering, Admiralty), and Mr. A. H. Mumford, O.B.E., B.Sc.(Eng.) (Deputy Engineer-in-Chief, G.P.O.), have been elected. Mr. E. Leete (director and consultant, London Electric Wire Co. & Smiths, Ltd.) has been elected hon. treasurer.

The four vacancies on the Council have been filled by the following: Professor M. W. Humphrey Davies, M.Sc. (Professor of Electrical Engineering, Queen Mary College, University of London); Mr. J. M. Ferguson, B.Sc.(Eng.), M.I.Mech.E. (chief engineer, English Electric Co., Ltd.); Mr. R. J. Halsey, C.M.G., B.Sc.(Eng.) (Assistant Engineer-in-Chief, Post Office Engineering Department); and Mr. H. V. Pugh, M.I.Mech.E. (chairman, Eastern Electricity Board). The Council has co-opted Mr. J. R. Rylands, M.Sc., J.P. (director and chief engineer, E. Green & Son, Ltd.), to fill the casual vacancy created by the election of Mr. Mumford as a vice-president before the completion of his term of office as an ordinary member of the Council. Associate members: Mr. D. C. Flack, B.Sc.(Eng.), Ph.D., A.M.I.Mech.E. (electrical design engineer, Aircraft Division, Bristol Aeroplane Co.), and Mr. D. H. Tompsett, B.Sc.(Eng.) (at present in Nelson Research Laboratories, English Electric Co., Ltd.). Companion: Sir John Dean, B.Sc. (chairman and chief executive, Telegraph Construction & Maintenance Co., Ltd.).

The new chairmen, vice-chairmen and committee members of the various Sections are as follows:—

Measurement and Control: Chairman, Mr. J. K. Webb, M.Sc.(Eng.), B.Sc.Tech.; vice-chairman, Mr. C. G. Garton; members, Messrs. A. C. Lynch, M.A., B.Sc., R. E. Martin and A. Nemet, Dr.Sc. Techn. The Committee has co-opted Mr. F. C. Widdis, B.Sc. (Eng.), to fill the casual vacancy created by the election of Mr. Garton as a vice-chairman.

Mr. H. V. Pugh

Mr. J. R. Rylands

Dr. D. C. Flack

Mr. D. H. Tompsett

Sir John Dean

Radio and Telecommunication: Chairman, Mr. G. Millington, M.A., B.Sc.; vice-chairmen, Mr. R. J. Halsey, C.M.G., B.Sc.(Eng.), and Mr. T. B. D. Terroni, B.Sc.; members, Messrs. D. A. Barron, M.Sc., G. G. Gouriet, J. Moir, A. J. Young, B.Sc.(Eng.), and Commander C. G. Mayer, O.B.E., U.S.N.R.

Supply: Chairman, Mr. D. P. Sayers, B.Sc.; vice-chairmen, Messrs. J. S. Forrest, D.Sc., M.A., and J. R. Mortlock, Ph.D., B.Sc.(Eng.); members, Messrs. G. S. Buckingham, B.Sc.(Eng.), W. J. Carfrae, B.Sc., J. L. Egginton, B.Sc., and O. W. Minshull, B.Sc.

Utilisation: Chairman, Mr. R. A. Marryat, B.Sc.(Eng.); vice-chairmen, Messrs. J. M. Ferguson, B.Sc.(Eng.), and T. E. Houghton, M.Eng.; members, Messrs. J. W. Binns, C. M. Cock, R. F. Richardson, M.B.E., and C. D. Wilkinson.

Illuminating Engineering Course

The College of Further Education, William Street, Slough, proposes to run a short course on illuminating engineering in 1959. A series of seven lectures are proposed, one evening a week, starting some time in the middle of January. The course will be conducted by Mr. H. Hewitt, A.M.I.E.E., F.I.E.S., of Thorn Electrical Industries, Ltd. Particulars can be obtained from Mr. L. F. Needham, Lecturer in Electrical Engineering at the College.

INDUSTRY AND THE HOUSE

Debate on Privilege Issue

By A. M. F. PALMER, A.M.I.E.E., M.Inst.F., M.P.

I HAVE said often that you cannot keep the electricity supply industry out of the news. It will keep appearing in the most unlikely places. Hence, it was no surprise to me that the object around which the great Parliamentary debate on the privilege issue centred should be an Electricity Board. As I say, electricity is everywhere.

For once I indulged in the rare experience of sitting in the Chamber and hearing almost every word uttered; no easy feat in these days for any busy parliamentarian. I was not alone in my devotion. The green benches were crowded all day. For once in this fast withering House a theme had been discovered which stimulated the mind and aroused the feelings of each and every legislator.

Also this day of oratorical strife was to culminate in a clash in the lobbies the outcome of which no one could predict with certainty beforehand. The advance odds were perhaps a little in favour of the Committee of Privileges getting home by a short head. But nobody could be sure. In fact, several of my colleagues—on both sides of the question—told me that they had made up their minds only a minute or so before Mr. Speaker put the fateful amendment.

Let there be no mistake. The result of the vote was a personal triumph for Mr. Herbert Morrison. It has gone some way, perhaps, to soften the harshness of the fate that excluded him in the recent past from the leadership of the Opposition. I doubt if the vote would have taken the course it did if anyone else had led the protest against the Committee of Privileges' recommendation. He was able to detach from the main body of Labour members a sufficiently numerous group of dissenters to compensate for that assorted bag of Conservatives—including Lady Tweedsmuir, Lord Hinchingbrooke, Sir Patrick Spens (former chairman of the Select Committee on Nationalised Industries) and Mr. Nabarro—who unflinchingly marched with the losing side.

Pattern of Voting

Was there any rational pattern about the voting? It is difficult to say. Both sides said they were concerned only for the protection of the ordinary citizen. But one opinion held was that he was best looked after—in matters touching on the libellous—by the law of the land and the wisdom of the Courts. The other opinion contended the citizen must be free to look for redress of his complaint—perhaps against Government servant or powerful corporation—to his representative at Westminster. But that statement is in itself a gross simplification of the narrow issue which is more subtle and really consists in defining the boundaries of Parliament.

If an honourable Member makes an allegation, perhaps against an individual or a group of persons, in the House of Commons during a debate, then it is automatically assumed he is acting in good faith and to the best of his knowledge. In any case he enjoys absolute privilege under the ancient laws of the Kingdom enshrined in particular in the Bill of Rights. That fact cannot be in question.

Likewise, if the same allegation is made in a parliamentary question either asked, printed on the order paper or even in draft in the Clerk's office, then absolute privilege is likewise allowed. But what happens if the allegation or charge is contained in a letter addressed to a Minister? Does such a letter constitute "a proceeding in Parliament?"

The Committee of Privileges reported that it did, the House in the end decided it did not. Those who took the view of Mr. Morrison and the Attorney General say that the obvious difference between a charge made in Parliament and the same charge contained in a letter to a Minister is that the first is made in the light of day, the second is hidden in the obscurity of the post. The first is open to challenge and answer. The second may speed unhindered on its treacherous course.

On the other hand, those who followed Mr. Butler's and Mr. Gaitskell's lead argued that the letter to a Minister is the inevitable development of Parliamentary relationships under the stress of modern life. It is therefore as much entitled to the protection of absolute privilege as is the written question and answer which appears in Hansard.

Where do we go from here? The answer is no abstract point for constitutional specialists alone to speculate about. Industrialists and their representatives, for instance, in perfect good faith constantly ask Members to look into or take up with the Department concerned some matter affecting the practice of a public Board or similar Authority. What if the suggestion made is held to reflect adversely on the reputation or professional competence of persons named or implied? Under the circumstances created by last week's vote Members are bound to think twice before doing anything. After all, the English laws of libel and slander are fairly tightly drawn.

To the dilemma, of course, lawyers have a perfectly simple solution. "Go ahead," they say, "act as you think right and the Courts will always uphold you provided there is no malice." But although lawyers profit financially from frequent appearances in the Courts, litigants generally do not and Members may therefore avoid the possibility of actions by leaving the complaints unanswered. On balance, I think that to be a loss rather than a gain to effective Parliamentary Government.

A secondary effect of the House's narrow decision may be a demand for closer Parliamentary supervision of public Boards and their work. In that connection I applaud the decision of the London Electricity Board not to pursue in the Courts their action against Mr. Strauss. Instead they have asked for and have been granted a Ministerial inquiry into their scrap disposal trading practices. Why wasn't this done in the first place? It seems such an obvious and sensible solution and would have saved everybody a lot of trouble.

LETTERS TO THE EDITOR

Letters should bear the writers' names and addresses, not necessarily for publication. Responsibility cannot be accepted for the opinions expressed by correspondents.

Inadequate Wiring Systems

IT has recently been estimated by the *Oxford University Bulletin of Statistics* that the unpaid bill for housework in Britain runs at £7,000 million a year. Great efforts have been made to provide extra horsepower for the British workman, but saturation figures on ownership of domestic appliances show that we have far to go before the British housewife has similar mechanical aids for her £570 worth of housework !

The principal deterrent to the increased use of electricity in the home is rooted in the wholly inadequate wiring systems of our houses. New houses are still being built with one socket outlet per room, including the kitchen, and many thousands of people are making do with out-of-date wiring, strained to capacity by the vacuum cleaner and a couple of electric fires. How many people have reluctantly given up the idea of having an up-to-date kitchen, fully equipped with the right electrical "tools," daunted by the considerable cost of re-wiring old houses, or of fitting endless adaptors to the solitary socket provided ?

The Electrical Association for Women has launched a campaign to educate women in the benefits of planning the wiring system as an integral part of a new house, and much work has been done along these lines by the Electrical Development Association and the electric wiring accessories manufacturers.

A considerable service could, however, be done by all members of the industry to convince the public of the utter stupidity of continuing to put up with insufficient facilities to make full use of the labour-saving and comfort-providing apparatus available to us all. Much more thought should be put into ways and means of keeping local authorities, architects and builders informed of the latest developments of the whole industry, so that these ideas can be incorporated into new property, and much more guidance could be given to housing authorities, electrical contractors, and the man-in-the-street, on adapting existing property to meet the changed conditions of living.

This is a very serious problem with no easy answer, but I am convinced there is enough brain in our industry to find a solution. It is certainly a fundamental problem to the extension of the uses of electricity in the home.

One suggestion I put forward is that of multiple socket outlets, mounted in rows of two and three at waist height, for the kitchen and main living rooms, with a consequent minimum of wiring. Your readers will undoubtedly have other ideas.

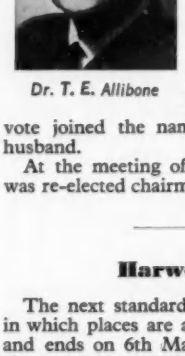
London, W.C.2. A. MACKENZIE PARKINSON,
Chairman,
Domestic Electrical Appliances Section,
British Electrical and Allied
Manufacturers' Association.

E.I.B.A. ANNUAL MEETING

THE annual meeting of the Electrical Industries Benevolent Association was held on 10th July at the C.M.A. offices, High Holborn, London, W.C.1. The president, Sir John Pickles, in presenting the annual report and accounts for 1957, said that in 1957 the Association had the largest increase in its income which it had ever been happy enough to experience. However, as the annual report pointed out, this could be no cause for complaceney or mere maintained effort, because, with the present rate at which the calls on the Association were increasing, the surplus which they had on last year's accounts would be changed into an ever larger deficit in the current year unless again they raised the level of their income, and it looked as though they would require an extra £6,000 in 1958. A 13 per cent increase in a single year in the number of people who had received help from the Association was something of which they could be proud. It was clear that the quality and the countless variety of welfare work which the Association did was being more widely appreciated.

The chairman of the Court, Mr. C. R. King, proposed the adoption of the report of the Council and the accounts and the chairman of the Finance Committee, Mr. F. E. C. Miller, in seconding the resolution, referred to increased support from the supply industry, mentioning that Mr. R. R. B. Brown had obtained 1,300 new contributors from his staff, which would mean an increased income of £1,000 a year. He paid tribute to the work of Mr. King.

After the annual meeting there was a Council meeting at which Sir John Pickles, in installing Dr. T. E. Allibone as the new president, said that nuclear energy had come out of the realm of mathematical hypothesis into that of practical use, and it was appropriate that they should have a president from that field of activity. In Dr. Allibone they had a man who was not only at the top of the scientific tree and dealt in nuclear matters, but one who mixed most readily with his fellow men.



Dr. T. E. Allibone

Dr. Allibone proposed a vote of thanks to Sir John Pickles for all that he had done for the Association during his term of office, and in proposing the vote joined the name of Lady Pickles with that of her husband.

At the meeting of the Court which followed, Mr. King was re-elected chairman.

Harwell Reactor School

The next standard course at the Harwell Reactor School in which places are available starts on 10th November next and ends on 6th March, 1959. The fee for the course is £250 exclusive of accommodation. Details can be obtained from the Principal, Reactor School, Atomic Energy Research Establishment, Harwell, Didcot, Berks.

INDUSTRIAL NEWS

London Midland Region Railway Electrification

With the completion of the overhead electrical equipment to supply power to trains on the Styal line (between Wilmslow and Mauldeth Road stations) the London Midland Region's main line electrification programme enters a further stage. The equipment is now undergoing static testing and this will be followed, later in the year, by the energising of the overhead equipment, trial running of electric trains and locomotives and the training of drivers. The Styal line electrification is the pilot project for the whole main line scheme which includes the line from Euston to Birmingham, Crewe, Manchester and Liverpool.

The first main part of the scheme will be the line from Manchester to Crewe scheduled for completion by the end of 1960. Much work has already been done on the section. Of the 4,500 foundations to be installed for the supporting masts for the overhead equipment, 2,144 have been completed. More than 1,400 complete overhead structures have been erected out of a total of 6,000. Heaton Norris feeder station and East Didsbury Track Sections cabin are nearly complete and a further cabin at Wilmslow is under construction. In connection with the electrification of the line from Liverpool to Crewe, the engineers are at present proceeding on a survey of the line.

Babcock & Wilcox American Nuclear Power Collaboration

It is announced by Babcock & Wilcox, Ltd., that following many years' co-operation with the Babcock & Wilcox Company, of America, in the design of conventional steam-raising plant, these two companies have now extended their technical collaboration into the nuclear power field. The effect of the arrangement is the pooling of a fund of technical knowledge and practical experience covering a wide and rapidly-expanding field of nuclear engineering development.

Babcock & Wilcox, Ltd., collaborated in the design and construction of all the specialised steam-raising plant for the Calder Hall and Chapelcross atomic power stations and, as a member of the English Electric, Babcock & Wilcox, Taylor Woodrow atomic power group, is currently engaged in the construction of the Hinkley Point nuclear power station.

The Babcock & Wilcox Company is the principal contractor for the design and supply of the pressurised-water thorium convertor reactor and the steam-raising equipment for the Indian Point power station of the Consolidated Edison Co. of New York and has a contract for the supply of the complete propulsion plant for the world's first nuclear-powered merchant ship, N.S. *Savannah*, which incorporates a pressurised-water reactor. The company's production facilities include the first privately built factory for the fabrication of nuclear fuel elements and a laboratory for the testing of reactor cores under critical conditions.

Pump Makers' 75th Anniversary

Holden & Brooke, Ltd., Manchester, celebrates the 75th anniversary of the founding of the company this year, and to commemorate the occasion it has produced an attractive and well-illustrated brochure briefly outlining the history of the company. The business commenced with the manufacture of boiler feed injectors and in addition small gas engines, door locks and automatic sweet delivery machines were made and to-day the company produces many types and sizes of pumps. Among the interesting work carried out mention is made of the Pearn horizontal treble ram pumps supplied to the Anglo-Iranian Oil Co., and the design and supply of pumps for the "Pluto" pipeline which conveyed petrol supplies from Britain to France during the last war.

Scientific Film Association

At the annual meeting of the Scientific Film Association held on 19th June, Mr. L. Hornsby, who was re-elected president, in presenting the report for the year to 31st March last said that there had been a membership increase of 25 per cent; the publication of information on 1,250 films; the organisation of eight meetings and a residential course; participation in three major international conferences; and a growing demand for the consultancy services of the Association.

Mr. A. M. Hughes, general secretary, announced that in the current year the Association hoped to arrange six meetings of its own, seven meetings jointly with other bodies, two residential courses, and several film viewing sessions for industry. The Association also intended to foster further regional development on the lines of the Merseyside Industrial and Scientific Film Association. The meeting endorsed the adoption of a new organisational structure, designed to encourage the activity of individual members organised in Sections, whilst developing further the centralised services of the Association. This increase in activity necessitated a move to new premises in the immediate future to allow for further growth, and the Association would shortly be housed in an office suite provided by ASLIB at its new premises at 3, Belgrave Square. The meeting was preceded by an exhibition of films.

Electric Enamelling Furnace

A continuous electric enamelling furnace of 750 kW capacity has been installed at the Enfield works of Belling & Co., Ltd., where it has been in operation since January. The furnace was designed and built by Ferro Enamels, Ltd., Ounsdale, Wolverhampton. Improved distribution has been achieved by spreading the loading elements over the furnace walls and floor. Installed on the centre line of the furnace in the burning chamber is a centre wall to carry part of the elements.

Uniform heat distribution in the pre-heat zone has been achieved by a specially designed hot-air inner seal. Between the inner air seal and the interior air seal a hot air convection system is installed which draws the recirculated air over the outgoing ware, with a cooling effect on it and a more rapid preheating of the ingoing ware.

To adapt the furnace to varying production requirements and to take advantage of all possible efficiencies in operation, the hot zone is divided into five sections. The five temperature indicating and controlling pyrometers

Control panel for Ferro Enamels furnace

and a six-point recording pyrometer are mounted on a control panel together with the starters for the furnace motors.

Berkeley Insulation Contract

The thermal insulation contract for the 275 MW nuclear power station now being built by the A.E.I.-John Thompson Nuclear Energy Co. at Berkeley has been awarded to the Cape Asbestos Co., Ltd., which will carry out the entire insulation work at this station, involving the two 80ft high reactor vessels, 16 heat exchangers, and CO_2 ducting and main steam pipes.

The "Caposite" moulded amosite asbestos insulation will be manufactured at the company's Barking and Hebden Bridge factories, and the "Rocksil" rock wool insulation at its Stirling Works.

Switchgear for Kariba Scheme

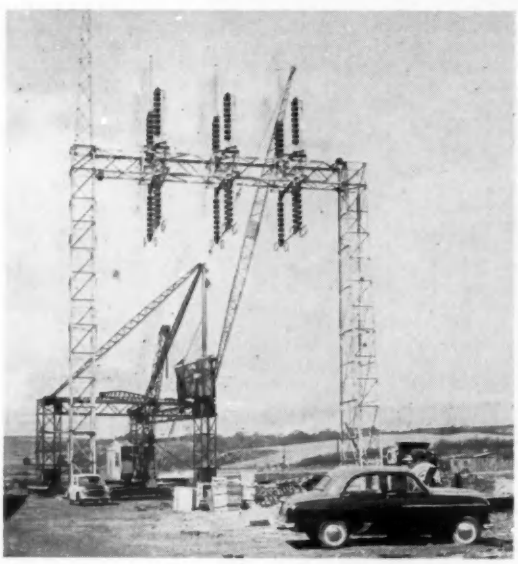
As part of one of the largest switchgear contracts ever placed in Great Britain, the British Thomson-Houston Co., Ltd., is to supply for the Kariba scheme in Rhodesia twenty-five 330 kV oil circuit-breakers and over a hundred three-phase sets of 330 kV vertical-lift pattern isolators specially designed to achieve maximum space economy in the high-voltage switching stations at Kariba, Kitwe, Norton, Salisbury, Sherwood, Bulawayo and Lusaka.

In the duplicate-busbar layouts to be adopted at the switching stations, five three-phase sets of isolators will be supplied for each circuit, two sets being mounted on high-level gantries, the cross-bar frames of which will be 70ft above ground. The accompanying picture was taken during the erection for operation tests of one of these isolator assemblies at the Runcorn works of Joseph Parks & Son, Ltd., the designers and manufacturers of all the switching station steelwork to the order of B.T.H.

The circuit-breaker isolators are underhung from the gantry. They are shown in the closed position and complete with their corona rings. The top "by-pass" isolators are shown with their contacts in the open position and earthing switches connected. Their corona rings had not been fitted at this stage of erection.

The isolator sets are operated by a motor mechanism mounted at ground level and connected to the isolators by a system of torque tubes and interphase coupling rods. An interesting feature of certain of the steelwork structures will be the provision of a 65ft high lightning protection spike, which can be seen mounted on the top of the left-hand tower in the picture. The electrical and mechanical consulting engineers for the Kariba project are Messrs. Merz & McLellan.

B.T.H. 330 kV isolators on test at the Runcorn Works of Joseph Parks & Son



B.I.M. Conference

The challenge to managers of the economic, political and technological changes of the modern world is to be the theme of the 1958 National Conference of the British Institute of Management which will be held in Brighton from 26th to 28th November next.

New Oxford College

A new men's college, St. Catherine's, is to be built at Holywell Great Meadow, Oxford. It will provide places for 400 undergraduates, half of whom will be scientists, mathematicians and engineers. The Censor of St. Catherine's Society, Mr. Alan Bullock, stated last week that leading industrial firms had promised to contribute £610,000 towards the total estimated cost of £2,350,000. The University Grants Committee would make available a further £250,000 and would include the project in the 1961-63 building programme. He said that in order to open part of the college by October, 1961, they would need to bring the promises so far received up to £1,250,000. The higher proportion of places to be offered for science in the new college was a recognition of the much greater part which science had to play in university education and its crucial importance to our national life.

The firms who have so far promised to contribute include the General Electric Co., Ltd., Associated Electrical Industries, Ltd., Mullard, Ltd., Tube Investments, Ltd., C. A. Parsons & Co., Ltd., Albright & Wilson, Ltd., and Thomas de la Rue.

Railway Station Public Address System

Easco Electrical (Holdings), Ltd., has received a contract from the British Transport Commission for the design, supply and installation of a public address system for passenger announcements at Grimsby Town Passenger Station. The installation is expected to be completed next month.

Mullard Educational Exhibition

The range of technical education facilities provided by the Mullard Educational Service to schools and technical colleges throughout the country was featured at a special exhibition held at the Electronics Centre, Mullard House, London, last week. In addition to the various displays, instructional films and filmstrips were shown continuously during the exhibition.

Working demonstrations showed equipment which could be constructed by students and used subsequently in the school laboratory. These items included a newly designed and simplified oscilloscope and apparatus for making measurements of valve and transistor characteristics and for demonstrating the working of photoelectric cells. Other displays included apparatus for comparing the characteristics of vacuum and gas-filled valves, a high voltage measurements meter, and demonstration boxes of various magnetic materials.

Henley Exhibition in Sheffield

Nine tons of exhibits were unloaded and erected by nine men in only three days to form a comprehensive display of cables and distribution equipment arranged by W. T. Henley's Telegraph Works Co., Ltd., in Sheffield during the first week in July. The exhibits, which included many large items of distribution equipment, were transported by road, unloaded on Friday and the exhibition was ready for visitors by Monday morning. By permission of the Cutlers' Company, the exhibition was held in the Hadfield Hall of the Cutlers' Halls in Sheffield. A large number of customers from Sheffield and the surrounding districts visited the exhibition, which ranged from fine winding wires to supertension cables suitable for 132 kV. In addition to normal power cables and wiring cables, there were special displays of cables for railway electrification, telecommunications, the shipbuilding industry and steel making industry. Colliery cables fitted with

The distribution equipment section of the Henley Exhibition in Sheffield

flameproof couplers formed part of the special colliery cable exhibit. Supertension cables included solid types, oil-filled types and gas cushion types. Distribution pillars and panels and underground disconnecting boxes were included in the display of distribution equipment. Other exhibits included service fuses, terminal boxes, joint boxes, consumers' control units, earth-leakage circuit-breakers and the Henley rising main system. Demonstrations were given of the fitting of terminating glands to wire armoured p.v.c. cables.

B.S.I. Bristol Sales Office

The Lord Mayor of Bristol, Alderman F. G. W. Chamberlain, on 15th July formally opened as a service to industry in the west of England, a sales office of the British Standards Institution. The office is at the Old Council House headquarters of the Bristol Chamber of Commerce, on whose initiative this sales point has been made available. The B.S.I. was represented at the opening by Mr. G. Weston, its technical director. The Bristol sales office is the second step in a planned programme by which it is hoped eventually to establish similar selling points for British Standards in key centres of British industry. The first of these was established three years ago in Birmingham. The Institution also has sales facilities at its branch office in Manchester.

Works Visits

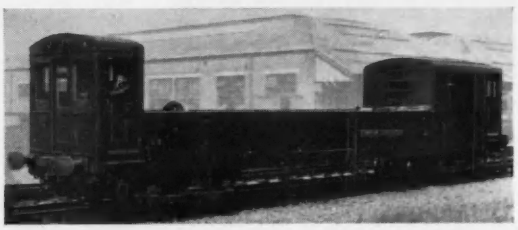
A party of Dutch students in applied physics from the Technology University, Delft, led by Professor A. M. M. Botts, visited the High Wycombe works of Airmec, Ltd., recently and were received by Dr. J. C. Simmonds, managing director, and members of the staff. Various equipment was shown and demonstrated, including an analogue computer, industrial automatic control equipment and a number of electronic instruments.

The Venezuelan Ambassador, His Excellency Dr. Mauel Dagnino, visited the Loughborough works of the Brush Electrical Engineering Co., Ltd., on 9th July. The party made a tour of the works and inspected transformers, switchgear and other items of equipment which are to be shipped by the Brush Co. to Venezuela.

Renovating Old Electric Locomotives

Two London Transport electric stores locomotives (Nos. L.8 and L.9), built as battery locomotives in 1909 by W. R. Renshaw & Co., Ltd., are being renovated at the Acton Works. After their overhaul they are expected to give a further fifteen years' service. The two locomotives were used originally for track maintenance purposes for the Metropolitan District Railway and are among the oldest electric locomotives in the country.

The two battery locomotives were converted at some time before 1925, by removing the batteries and altering the battery compartment to provide an open gondola-type platform for carrying materials and stores. With the removal of the batteries, the locomotives picked up current from the rails in the normal way. In 1951 the original G.E.69 type traction motors were replaced by the G.E.212 type and were changed again in 1955-56 to the W.T.54BB type. The original equipment, however, remained virtually unchanged. As it is considered that these locomotives still provide the best means of carrying materials between Acton and Ealing Common, it has been decided that the obsolete traction equipment should be replaced by a later type for which spares are available. The original type of equipment fitted to L.8 and L.9 will then be in use only in No. L.10, the Acton Works Yard locomotive. A number of B.T.H. DB.260 equipments, normally used with WT.54B motors, are available as a result of the scrapping of some District Railway 1910-13 "C," "D" and "E" stock cars, and two of these equipments are to be used in L.8 and L.9. This work will mean that the vehicles will then be fitted with traction control equipment of a type in general use on the District Line "Q" stock, and also that the wiring of the locomotives will be completely renewed during the renovation.



Stores locomotive L.9, built in 1909, which London Transport is renovating for further service

Conference on Market Research

At the invitation of the Board of Trade, the Incorporated Sales Managers' Association has undertaken the work of co-ordinating United Kingdom activities in connection with a projected international conference on market research on a European scale. The European Productivity Agency is organising the conference for next spring. The conference will be attended by 100 delegates, mostly nominated by trade associations in Western Europe. Approximately ten delegates from Britain are expected to attend. The purpose is to perfect practical means of supplying industry with data and information for sales forecasting.

Electric Furnaces for Canada

The largest electric furnace ever exported to Canada left Cardiff for Montreal by the s.s. *Birmingham City* on 10th July, and its major components will be transported by Canadian National Railways. The furnace, weighing 163 tons, has a 60-ton bowl with a molten metal capacity of 40 tons. Canadian Steel Wheel, Ltd., Montreal, has placed orders for two such furnaces with G.W.B. Furnaces, Ltd., and the second will be shipped in about three months.

Winding-up Order

An order for the compulsory winding up of Peto Scott Electrical Instruments, Ltd., Weybridge, Surrey, was made by Mr. Justice Wynn Parry in the Chancery Division on Monday last on the petition of Suntex Safety Glass Industries, Ltd., creditors for £1,620.

Mr. L. H. L. Cohen, for the company and opposing unsecured creditors for £116,497, said that the company's statement of affairs showed assets estimated at £412,562 and indebtedness of £463,000. The preferential creditors amounted to £221,572, the largest being the Customs and Excise

for purchase tax. If the company's assets realised their estimated total these ought to be 15s in the £ for the unsecured creditors.

His Lordship said that on the figures before him and the fact the company was insolvent and in the hands of a Receiver, he ought not to distinguish between preferential and non-preferential creditors. He must make a winding-up order.

Edmundsons Acquisition

Edmundsons Electric Co., Ltd., has acquired the issued ordinary share capital of W. H. Stone & Co. (Cardiff), Ltd., electrical wholesalers. Mr. W. H. Stone continues as chairman of the company.

Another Canadian Submarine Cable

On 13th July a second circuit in the 138 kV submarine power cable link between Vancouver Island and the mainland of British Columbia was put into commission. The cable was manufactured for the British Columbia Electric Co. by British Insulated Callender's (Submarine Cables), Ltd., at their Trafford Park works. British Insulated Callender's Construction Co., Ltd., who were responsible for the laying and testing, chartered H.M.T.S. *Monarch* to transport the cable from Manchester to Vancouver and to lay the four continuous lengths between the mainland and Vancouver Island.

The existing submarine power cables, which were also manufactured and installed by the B.I.C.C. group, have been in successful operation since September, 1956. These, with the two continuous lengths of 16 miles and two of about three miles required to complete the second circuit, plus a spare cable, bring the installed lengths of submarine cable for this power link to a total of over 133 miles. The combined current-carrying capacity of the two circuits, which bring Bridge River hydro-electric power to Vancouver Island is now 250 MW.

The 138 kV cable is of the single-core gas-pressure type. The 0·35 sq in conductor consists of a spiral steel duct over which are applied two layers of copper wires and a conducting screen of three impregnated metallised paper tapes. The dielectric, which itself is screened with copper tape, consists of pre-impregnated paper tapes. The lead alloy sheath is reinforced by tin-coated bronze tapes over which is applied vulcanised rubber. Then follows a jute yarn bedding and a single layer of galvanised steel wire armouring. These wires are protected by two bituminised layers of jute yarn. The overall diameter is nearly 4in and the weight of the entire 133 miles of cable is about 5,400 tons.

Trade Announcements

Bulpitt & Sons, Ltd., have appointed Mr. J. G. Meadows Smith as their representative in the East Anglian territory covering the counties of Norfolk, Suffolk, Essex, Huntingdon and Cambridge in succession to Mr. D. C. Wooding who has emigrated to Canada. Mr. A. McCaughran has been appointed as assistant to Mr. R. Graham in Scotland and Northern Ireland.

During a recent visit to Italy Mr. P. B. Ades, sales manager of **Airmec, Ltd.,** High Wycombe, was successful in negotiating an agency agreement with Apparacchi Scientifici Federici, of Milan, for the exclusive rights to market their ultra-sonic drilling and ultra-sonic medical equipment in the United Kingdom.

Ashley Accessories, Ltd., has appointed Mr. A. Beech, 47, Concord View Road, Kimberworth, Rotherham, as sales representative for the East and West Ridings of Yorkshire, S.E. Lancashire and N.W. Lincolnshire, and Mr. G. Oliphant, 144, Leyfield Road, Liverpool, 12, as sales representative for Lancashire (except S.E. Lancashire), South Westmorland, North Cheshire and North Wales.

Firth Cleveland Instruments, Ltd., Treforest Industrial Estate, Glamorgan, a subsidiary of Simmonds Aerocessories, Ltd., in the Firth Cleveland group of companies, announces that it has concluded a licensing agreement with the Gilbert & Barker Manufacturing Co., of West Springfield, Massachusetts, U.S.A., to manufacture and market the "Gilbarco" electronic tank contents gauge.

The **Woden Transformer Co., Ltd.,** has appointed Mr. G. T. Green as representative for its north west territory. His address is 153, Winchester Road, Davyhulme, Manchester (telephone: Erinston 6816), and he will work in the area covered by the North Western and Merseyside and North Wales Electricity Boards.

The **Ransome & Marles Bearing Co., Ltd.,** asks us to remind readers that its Glasgow office is now at 380, Argyle Street (telephone: Central 3948).

Bescol (Electric), Ltd., has appointed Leslie Maynard, Ltd., 306b, Fulham Road, London, S.W.10, as its agents for the London area.

The **Kenwood Manufacturing Co., Ltd.,** Old Woking, Surrey, has available for dealers a new four-colour showcard for its knife and scissors sharpener.

The head office of **Telephone Rentals, Ltd.** (including Supply and Publicity Departments), is now at 197, Knightsbridge, London, S.W.7 (telephone: Kensington 1471).

The London telephone number of **A. H. Hunt (Capacitors), Ltd.,** is now Vandyke 6454.

Albright & Wilson Activities

A booklet with the title "Facts about Albright & Wilson" has been issued by Albright & Wilson, Ltd., illustrating in colour and describing the structure of the Albright & Wilson group of companies and the activities of some of the larger manufacturing companies within the group.

TRADE MARK APPLICATIONS

APPLICATIONS have been made for the registration of the following trade marks. Objections may be entered up to 25th July:—

POLYPLAN (design). No. 772,552. Class 9. Caliper squares, micrometers; and mechanical, electrical and electronic measuring instruments. —B. Z. Gam, Geneva, Switzerland. Address for service, c/o George Ham & Co., 93-94, Chancery Lane, London, W.C.2.

ORYX (design). No. 772,725, Class 9. Electrically heated soldering irons.—Oryx Electrical Laboratories, Ltd., 98, Dominion Road, Worthing, Sussex.

FFSS. No. B773,265. Class 9. Gramophones, radio-gramophones, radio and television receiving apparatus, etc., and apparatus for recording and reproducing sound, and parts.—Decca Record Co., Ltd., 1 and 3, Brixton Road, London, S.W.8.

COM-PAK. No. B774,380. Class 9. Electric current convertors, and parts. GENALEX. No. 775,388. Class 9. Radio, television, radar, telegraphic, telephonic, nautical, surveying, navigating, photographic, cinematographic, optical, weighing, measuring, signalling and checking (supervision) apparatus and instruments; scientific, electrical and electronic apparatus; talking and calculating machines; sound recording and reproducing apparatus; magnets and magnetic cores, all made of metal alloys or of bonded powders thereof, etc.—General Electric Co., Ltd., Magnet House, Kingsway, London, W.C.2.

GAUNTLET. No. 775,254. Class 9. Electric accumulators and parts.—Chloride Batteries, Ltd., Exide Works, Clifton Junction, Swinton, Lancs.

ROYAL STAR. No. 775,395. Class 9. Radio receivers and radio gramophone apparatus.—Kolster-Brandes, Ltd., Cray Works, Sidcup, Kent.

ADVAC. No. 775,661. Class 9. Radio telephonic apparatus and instruments; electrical signal generators for use with telecommunication, radio and television apparatus and instruments; electric testing and measuring apparatus; electric current transformers, electric coils; resistances and alternators, all being electrical goods for use in radio and television apparatus and in radio and television testing apparatus; and parts.—Advance Components, Ltd., Roebuck Road, Hainault, Essex.

LIGHT THIEF. No. 775,899. Class 9. Electrical advertising signs and parts.—Leon Goodman Displays, Ltd., 119-125, Whitfield Street, Tottenham Court Road, London, W.1.

MILLISNAP. No. 776,203. Class 9. Electric switches.—Vigilant Switchgear, Ltd., 178, New Town Row, Birmingham, 6.

ELECTRAPEX. No. 774,860. Class 11. Clothes dryers and clothes airers (being parts of heating installations), boilers (not being parts of machines) for washing clothes, convector heaters, fires, toasters, refrigerators and cooling cabinets, all being electric.—Lamb, Hingley & Co., Ltd., Stour Works, Stourvale Road, Lye, Stourbridge, Worcs.

ISODUCTIVE. No. 775,609. Class 11. Electrical heating apparatus and parts.—Kestner Evaporator & Engineering Co., Ltd., 5, Grosvenor Gardens, Westminster, London, S.W.1.

ARNOLITE. No. 773,478. Class 17. Insulating materials, but not including insulating varnish or any goods of the same description as insulating varnish.—Watliff Co., Ltd., Lombard Road, Morden Road, South Wimbledon, London, S.W.19.

PARLIAMENTARY REPORT

Mr. Strauss and the London Board

By 218 votes to 213 the House of Commons decided last week to reject the finding of the Committee of Privileges that the letter written by Mr. G. R. Strauss, Labour M.P. for Vauxhall, to the Paymaster General on 8th February, 1957, making allegations against the London Electricity Board was a "proceeding in Parliament" and therefore protected by Parliamentary privilege.

Mr. Strauss raised the matter in Parliament after the Board, through their solicitors, had threatened to take proceedings for libel because of certain statements in the letter. He had alleged in his letter that the Board's method of disposing of scrap cable was a public scandal and that it must lose the Board and the public "substantial sums which may amount to many tens of thousands of pounds a year and puts the non-ferrous scrap industry into an impossible situation." The Board defended their methods, saying that they were in the best interests of the Board and the London public.

In the debate Mr. R. A. Butler, Lord Privy Seal, and chairman of the Committee of Privileges, said that because members were precluded from putting down Parliamentary questions on the day-to-day administration of the nationalised industries, the majority of the Committee felt that a letter to a Minister concerning the affairs of the L.E.B. might in the light of modern circumstances be properly regarded as a proceeding in Parliament and should be protected by privilege.

Mr. Herbert Morrison led the opposition to this view. What was meant in the Bill of Rights by "a proceeding in Parliament," he said, was a question of law. The House could put their own interpretation on it, but that would not be binding in any court of law. His opinion, without the slightest doubt, was that Mr. Strauss's letter was not a proceeding in Parliament.

When he spoke in the debate, Mr. Strauss said it had been suggested that because there was a personal aspect in the case it had weakened the privilege aspect. That was a false argument, because a member was not debarred from raising a matter in the House if he had a personal interest, provided he declared that interest. In this case his interest was exceedingly remote. The words in his letter expressed the views he held. They were not an attack on an individual but upon the conduct of a public board. He had used the word "scandal" in its broad sense and not in its narrow sense.

Making the last speech in the debate, Mr. Chuter Ede said members could not discharge their duties to constituents unless they had an approach to Ministers. It was for the member concerned to frame his letter so that it expressed his views. It might be necessary, in doing this, to say things in terms which would not be tolerated in any other connection and that had been the inherent value of privilege. What the House decided would largely determine the efficiency with which M.P.s could discharge their duties to constituents in future.

The report of the Committee of Privileges was rejected by the vote given above. An amended motion, declaring that Mr. Strauss's letter was not a proceeding in Parliament and that the letters from the chairman of the L.E.B. and their solicitors did not constitute a breach of privilege, was carried by 219 votes to 196 votes.

The London Electricity Board subsequently announced that in view of the debate in the House of Commons they had decided not to proceed with the intended libel action against Mr. Strauss but would, of course, be free to reconsider this decision in the light of changing circumstances. They had requested the Minister of Power, and the Minister had agreed, to arrange for an independent inquiry to be held into the methods adopted by the Board for the disposal of scrap cable and into allegations made regarding these matters, and to report to the Minister thereon.

Pumped Storage Schemes

In answer to Mr. Nabarro, Mr. Niall Macpherson, Under Secretary, said that the Cruachan section of the Loch Awe scheme, which the Secretary of State for Scotland was now considering, provided for pumped storage plant and had an installed capacity of 400 MW at an estimated cost of £37/kW. The Board had also prospected at Balmaha and Loch Sloy and they estimated that at these sites it might be possible to develop pumped storage schemes with a further installed capacity of up to 1,600 MW at about the same cost.

Questioned further, Mr. Macpherson explained that with hydro-electric schemes it was possible to choose the load factor required and to design for it. For a pumped storage scheme, on the other hand, one had to have the supplies available from the base load of a station operating at a high load factor. Secondly, one needed an adequate peak demand for the power from the pumped storage station. What the North of Scotland needed at present was supplies not for peak loads but for intermediate loads, and the Secretary of State was satisfied that the cost would be less at Strathfarrar than at any other available centre.

The planned average load factor of the Hunterston station was 80 per cent and its cost, exciuding the initial fuel charge, was estimated to be £111/kW installed or £133/kW sent out. The output would be fed into the South of Scotland Board's grid, with which the proposed pumped storage scheme at Loch Awe, if approved, would also be linked.

Factory Inspectorate

Mr. Iain Macleod, Minister of Labour, told Dr. Stross that since the publication in October, 1956, of the White Paper on the staffing and organisation of the Factory Inspectorate the number of engineering and chemical inspectors had been increased from 18 to 24 and six more were in process of appointment. An open competition to fill the remaining vacancies would shortly be advertised.

Reactor Research

Mr. Roy Mason asked the Prime Minister whether a decision had yet been reached to adopt the planned homogeneous aqueous reactor at Winfrith Heath as a joint project with the Organisation for European Economic Co-operation.

Mr. Macmillan replied that it had been decided on technical grounds that the homogeneous aqueous reactor system would not at present be suitable for a major research and development effort, either by the Atomic Energy Authority alone or as a joint programme under the European Nuclear Energy Agency. Discussions were now in progress in the Agency about a joint research programme on the high temperature gas-cooled reactor, a system which held considerable promise for the generation of power but had not yet been investigated in detail. This would include the construction of an experimental reactor in the United Kingdom. He hoped that a satisfactory agreement would be concluded in the next few months.

Harwell Isotope School

Mr. F. J. Erroll informed Mr. Mason that since its inception in 1951 more than 800 students from British industry had attended the Isotope School at Harwell. He was satisfied that industry was well aware of these facilities and was taking full advantage of them.

Applications of Research

Mr. Nicholls told Mr. Elliott that the Engineering Research Association had developed an effective liaison and advisory service for its member firms to get research results across to industry, particularly at the shop floor level. It was spending one-third of its resources on this service. Short instructional courses for foremen and works executives on new production

techniques were held in the Association's Melton Mowbray laboratories. A mobile unit provided practical demonstrations and instruction in members' works, and about 3,000 technical inquiries were answered each year.

British Trade Fair in Lisbon

Sir David Eccles informed Mr. Hector Hughes that there was to be a British Trade Fair in Lisbon from 29th May to 14th June, 1959, organised by the Federation of British Industries to show all kinds of goods made in the United Kingdom. There would also be a series of public events.

Capital for Rural Extensions

Mr. Mathew asked the Chancellor of the Exchequer if he would ensure that the problem of providing capital for farm and other rural electricity extension schemes as well as for reinforcement of existing supplies was fully taken into consideration during the review now being made with a view to a relaxation of restrictions in the public sector of investment.

Mr. Simon, Financial Secretary, said he knew that the Electricity Boards, in consultation with the Electricity Council, had taken the demand for rural electrification into account in submitting their proposals for the purpose of the current review of investment. The size of the programme eventually agreed upon would depend, however, on a great many factors, and the division of that programme between the various purposes which it covered would be considered in relation to the total requirements of the Boards.

Link with London Airport

Replying to an adjournment debate in the Commons, Mr. G. Nugent, Parliamentary Secretary, Ministry of Transport, said there were now three groups interested in promoting the monorail link between Central London and London Airport. They had been invited to submit detailed schemes showing methods of construction and operation, costs, sources of finance and methods of meeting safety standards.

The British Transport Commission had worked out an outline scheme for a conventional rail link from Victoria to London Airport, via Clapham and Feltham. It would be an express service and would involve the building of much extra line. The cost, including underground work at London Airport, was estimated at between £16,500,000 and £18,000,000. The scheme was not included in the Commission's modernisation programme and its construction would depend on it being an economic proposition on its own account.

Nuclear Submarine

The terms of the Anglo-U.S. agreement on co-operation on the uses of atomic energy for mutual defence purposes were laid before Parliament last week. It covers the exchange of classified information on "research, development and design of military reactors" and the purchase by the British Government from the United States of one complete submarine nuclear propulsion plant. This will be accompanied by classified information necessary for its design, manufacture and operation. The U.S. will sell enriched uranium for the plant, which will be fitted in H.M.S. *Dreadnought*, the Royal Navy's first nuclear submarine. The British Government hope that it will be possible to develop the United States design.

The agreement has to lie before Congress for thirty days before it comes into effect. No ratification is necessary in Parliament here.

FLOUR MILL DRIVE

NEW PLANT AT McDOUGALL'S MILL, MILLWALL DOCKS

THE essential characteristics of a flour mill drive are that the speed should be constant, to keep the product at a very high level of consistency. At the McDougall's Wheatsheaf Mill at Millwall Docks a Crompton Parkinson 270 h.p., 300 r.p.m., auto-synchronous motor was installed when the mill main drive was changed from steam to electric drive in 1923. It was decided recently to install a new machine and that a motor of approximately 400 h.p. would be adequate to drive the mill. During a survey of the project it was found that by modifying the existing bedplate it would be possible to install a 450 h.p. auto-synchronous motor with the same stator physical size as that originally suggested and give a still larger margin for future increases in power requirements. The work consisted of the removal of the old motor, removal of the l.v. switchboard to another site to make room for a new liquid rotor starter, a control desk and a stator switch panel. Other work included installing the new motor, complete with pulley and barring wheel, on the modified bedplate, installing a new barring motor coupling, and running a 6 kV supply from a substation to the motor room. Various alterations were also carried out within the mill roperace. The new motor, running at 333 r.p.m., drives processing plants located on four floors through 14-1⅛in Dawson ropes. The barring motor, a 15 h.p. K.R.N. slip-ring machine, is used to turn the mill at approximately 12 r.p.m. so that the initial inertia is overcome before the main motor is started. When the mill is started, the barring pinion is lowered on to the crown wheel which is mounted in-line with the main motor shaft. The crown wheel for this drive was made by taking a rubbing from the old wheel and was fitted to the main motor shaft before it left the works.

The main motor and exciter, the barring motor and the control panel of McDougall's flour mill

The mill is turned over at low speed to ensure that all the line shafts are functioning correctly and the main motor is then started. As the mill runs up to speed the barring gear is thrown out of mesh and the barring motor automatically switches off. The barring motor is controlled from the main control desk where there is an "inching" control incorporated, which allows the mill to be operated in fine increments for the purpose of changing belt drives.

The new switchgear installed includes a Crompton Parkinson ALA/1, 150 MVA, 6·6 kV stator switch unit, spring-closed, with electrical release from the control desk and an Allen West TS3 hand-operated liquid rotor switch.

NEW ELECTRICAL EQUIPMENT

Automatic Tape Reader

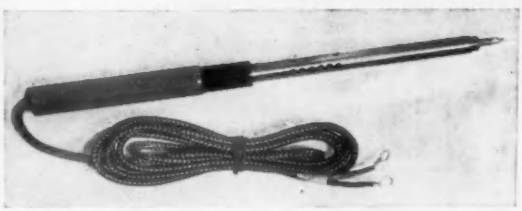
The increasing use of high-speed punch telegraph systems has led to the necessity for numbering of messages. Ideally this should be done automatically and standard or "routine" traffic should also be available without punching special tapes. All the necessary operational requirements are claimed to be made by a self-contained piece of equipment which British Telecommunications Research, Ltd., have developed for the AUTOMATIC TELEPHONE & ELECTRIC CO., LTD., Strowger Works, Liverpool, 7.

Known as the tape-reading, autosending equipment, Series TAA, it comprises two main units. One section incorporates the two tape-reading heads and all the operator's controls, while the other, which can be remotely mounted on a standard 19in rack, is the associated electronic distributor, for translating the information read by the tape reading heads or message senders in the telegraph code. Both reading heads can be loaded simultaneously and are sequentially switched so that as soon as one tape has been read, the other head comes into operation. In addition to the heads, the terminal includes an automatic numbering device, a 100-character test message sender and two 40-character message senders. One of the 40-character senders is used for the station call sign while the other provides for the automatic transmission and routine traffic. An automatic timing device permits the terminal to transmit test messages at predetermined times so as to test the circuit and associated equipment. The apparatus terminal measures 22in by 6½in by 9in and weighs 31 lb.

B.T.R. tape reading and automatic numbering apparatus

Soldering Iron

A low voltage pencil type soldering iron which weighs only 1½ oz has been placed on the market by BROWNING'S ELECTRIC CO., LTD., Green Street, Upton Park, London, E.13. It has an overall length of 8in and its $\frac{5}{16}$in diameter barrel has no screw heads or other projections, enabling joints to be made in the most inaccessible places. The heating up time is claimed to be approximately two minutes and standard models are available for 6 or 12 V. Elements can, however, be specially wound for 50 V. The loading is 18 W and the iron is suitable for working from a battery or a double-wound transformer. The price, complete with ¼in diameter bit, is 19s 6d.



Browning's Electric low voltage soldering iron

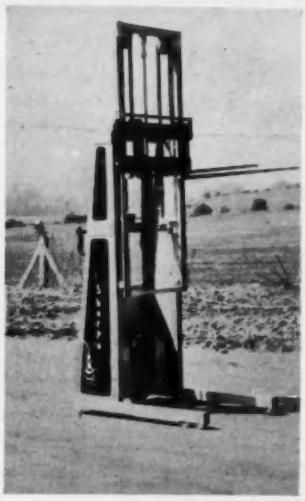
Digital Display Unit

An in-line digital display unit is being manufactured by COUNTING INSTRUMENTS, LTD., 5, Elstree Way, Boreham Wood, Hertfordshire. Each unit comprises a system of lenses whereby a figure or letter is projected on to a screen by means of twelve lamps.

The main advantage of this method is that the image always apears in the same plane, giving a very wide angle of view. The units can be banked together to give, for example, the read-out on a digital voltmeter, though numerous other applications exist. The large illuminated figure 1in by ⅝in gives high contrast for perfect visibility.

The standard model has provision for projecting the figures 0-9 and two decimal points. A number of other models are being developed showing letters, signs, and provision for either coloured characters against a black background or a coloured outline to a white character. The dimensions are 2⅜in high by $1\frac{5}{16}$in wide by $5\frac{13}{16}$in long. Standard models are available for 6, 12 and 24 V. The price per unit is in the region of £6.

Counting Instruments digital display unit



Salisbury Engineering "Sherpa" telescopic stacker

Telescopic Stacker

A telescopic stacker, with a capacity of 7 cwt at 15in load centre, is announced by SALISBURY PRECISION ENGINEERING, LTD., 1, Buckingham Palace Mansions, Buckingham Palace Road, London, S.W.1. The "Sherpa" is available in two standard sizes: Model VIIIA with a 9ft lift and Model VIIIB with a 12ft lift.

Either of these are available as a battery or mains operated truck. Battery trucks incorporate a charging socket, and a special Westalite charger can be supplied to suit the battery used. The telescopic frame is constructed from mild steel angle and is mounted on needle roller bearings. The framework is rigidly constructed and tested with a 50 per cent overload. The tandem front rollers and rear castors are all fitted with needle roller bearings. Two high tensile steel roller chains give absolute security of the load and a factor of safety of 8:1.

Celluloid in the Tropics

The Ministry of Supply has published its seventh report on "Plastics in the Tropics" (H.M. Stationery Office, 4s). This report covers celluloid and cellulose nitrate compositions and gives the results of a six-month test in Nigeria.

DOMESTIC ELECTRICAL EQUIPMENT

LOW TEMPERATURE HEATERS

IN the following survey approximately fifty manufacturers of low-temperature heaters, including convectors, water- and oil-filled radiators, panel heaters and fan heaters, etc., are listed. During the past twelve months the number of portable fan heaters on the market has increased and several more models are listed since the last survey. Incorporating a small motor driven fan, to assist in the circulation of the heated air, they provide an excellent means of heating the smaller room, such as a nursery or a kitchen.

Another attractive form of heating is the oil-filled electric radiator, enabling the user to enjoy all the advantages of central heating without the addition of installation and plumbing costs. This type is suitable for every room of the house and can be used either as the sole means of heating or as background heating. One typical manufacturer, Dimplex, Ltd., lists ten different models, in loadings ranging from ½ to 2 kW and in eight colours.

Among the heaters which have been introduced for the coming season is a new Jackson 2 kW convector, the 777/6 "Heatwave," with either switch or thermostatic control. From the G.E.C. comes a new 2 kW fan heater and a thermostatically-controlled panel heater while Electroway Heaters will introduce next month a series of portable convectors which can be converted into wall-mounting units within a few minutes.

Manufacturer	Name or Model	Type	Size (H.W. & D.) in inches Size	Element Loading	Method of Control	Casing	Finish	Price (excl. tax)	Purchase Tax
ARGOSY ENGINEERING, LTD., Hertford Road, Barking, Essex.	"Argosy"	Portable	24×20×8½	2 kW	Thermostatic	Steel	Old gold stoved enamel	£8 0 6	£1 14 9
P. W. BAKER & SONS (SALES), LTD., Fontwell Avenue, Eastergate, Chichester, Sussex.	"Mayhurst"	Portable fan heater	11×11 dia.	2½ kW	3-heat, thermostatic	Steel	Hammer bronze, red, yellow or blue	£11 19 9	£2 12 7
	"Elfin"	Portable fan heater	6½×11 dia.	1½ kW	Hot or cold switch	Steel	Guardsman red or pebble	£6 10 0	£1 8 6
	"Universal"	Wall mounting fan heater	6½×11 dia.	2 kW	Hot or cold switch	Steel	Guardsman red or pebble	£6 10 0	£1 8 6
BELLING & CO., LTD., Bridge Works, Enfield, Middx.	"Champion" 91A	Portable	22⅞×9¾ dia.	750 W	2-heat	Steel and cast iron	Silver bronze or grey and red	£3 12 6	£0 16 0
	"Champion" 92A	Portable	23⅞×10½ dia.	1·5 kW	2-heat	Steel and cast iron	Silver bronze or grey and red	£4 5 0	£0 18 9
	"Champion" 83A	Portable	24½×13 dia.	2½ kW	3-heat	Steel and cast iron	Silver bronze or grey and red	£6 4 0	£1 7 4
	"Convector" 751B	Portable	24×20½×8	1 kW	2-heat	Steel	Silver bronze or grey	£7 6 0	£1 12 2
	"Convector" 752B and 752AB	Portable	24×36×8	2 kW (752B) 3 kW (752AB)	3-heat	Steel	Silver bronze or grey	£11 10 0 (752B) £12 5 0 (752AB)	£2 10 8 (752B) £2 13 11 (752AB)
	"Zephyr" 851	Portable	19½×22½×6½	1 kW	3-heat (thermostat extra)	Steel	Old gold and bronze	£9 10 0	£2 1 10
	"Zephyr" 852	Portable	22½×33×6½	2 kW	3-heat (thermostat extra)	Steel	Old gold and bronze	£13 5 0	£2 18 4
	"Zephyr" 853	Portable	22½×45×6½	3 kW	3-heat (thermostat extra)	Steel	Old gold and bronze	£17 10 0	£3 17 0
	"Warm Air Circulator" 85	Wall fixing	23½×6×5	750 W	2-heat	Steel	Choice of four colours	£4 15 0	£1 0 11
	"Warm Air Circulator" 86	Wall fixing	23½×12×5	1·5 kW	2-heat	Steel	Choice of four colours	£6 2 6	£1 7 0
	"Warm Air Circulator" 87	Corner fixing	23½×9×6½	750 W	2-heat	Steel	Choice of four colours	£4 2 6	£0 18 2
	"Handy Heater" 952 (a), 952B (b), 952C (c) and 952D (d)	Floor mounting	12 (a), 22½ (b), 33¼ (c), or 50½ (d) ×4½ dia.	250 W (a), 500 W (b), or 750 W (c and d)	—	Steel and cast iron	Bronze	£1 15 0 (a) £3 0 0 (b) £4 16 6 (c) £6 8 9 (d)	£0 7 9 (a) £0 13 3 (b) £1 1 3 (c) £1 8 4 (d)

Manufacturer	Name or Model	Type	Size (H.W. & D.) in inches	Element Loading	Method of Control	Casing	Finish	Price (excl. tax)	Purchase Tax
BELLING & CO., LTD., Bridge Works, Enfield, Middx. *(continued)*	"Zephyr" 851F	Wall fixing	21×19½×5½	1 kW	3-heat (thermostat extra)	Steel	Old gold and bronze	£9 10 0	£2 1 10
	"Zephyr" 852F	Wall fixing	21×33×5½	2 kW	3-heat (thermostat extra)	Steel	Old gold and bronze	£13 5 0	£2 18 4
	"Zephyr" 853F	Wall fixing	21×45×5½	3 kW	3-heat (thermostat extra)	Steel	Old gold and bronze	£17 10 0	£3 17 0
	"Air Warmer" 961A	Wall or floor mounting	3⅜×8×13⅜	500 W	—	Cast iron	Black vitreous enamel	£2 5 0	£0 9 11
	"Air Warmer" 962A	Wall or floor mounting	3¾×8×18	1 kW	—	Cast iron	Black vitreous enamel	£2 17 6	£0 12 8
BENHAM & SONS, LTD., 66, Wigmore Street, London, W.1.	"Electro-Vapour" 4 PR	Semi-portable	21⅛×22⅛×5⅛	1 kW	Single or 3-heat switch	Cast iron	Sprayed aluminium or bronze paint	PRICES UPON APPLICATION	
	"Electro-Vapour" 6 PR	Semi-portable	27⅛×27×5⅛	1½ kW	Single or 3-heat switch	Cast iron	Sprayed aluminium or bronze paint		
	"Electro-Vapour" 7 PR	Semi-portable	27⅛×31⅛×5⅛	2 kW	Single or 3-heat switch	Cast iron	Sprayed aluminium or bronze paint		
	"Electro-Vapour" 9 PS	Semi-portable	27⅛×33⅛×8⅛	3 kW	Single or 3-heat switch	Cast iron	Sprayed aluminium or bronze paint		
BERRY'S ELECTRIC MAGICOAL, LTD., Touchbutton House, Newman Street, London, W.1.	"Raydair" 890/1	Portable or wall mounting	20×22½×7½	1 kW	Variable thermostatic	Steel	Peach bronze or penny bronze	£9 9 0	£2 1 6
	"Raydair" 890/1½	Portable or wall mounting	20×30½×7½	1½ kW	Variable thermostatic	Steel	Peach bronze or penny bronze	£13 15 6	£3 0 5
	"Raydair" 890/2	Portable or wall mounting	20×45×7½	2 kW	Variable thermostatic	Steel	Peach bronze or penny bronze	£21 5 0	£4 13 3

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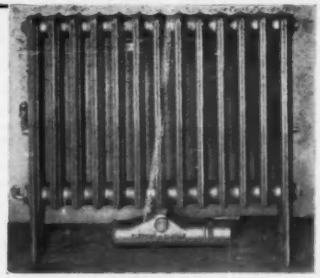
1. *Argosy Engineering 2 kW convector*
2. *P. W. Baker "Mayhurst" portable fan heater*
3. *Benham "Electro-Vapour" radiator*
4. *Berry's "Raydair" 890/2 heater*
5. *Belling "Zephyr" 1, 2 and 3 kW range*



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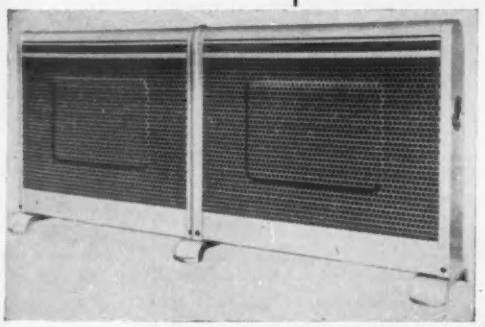

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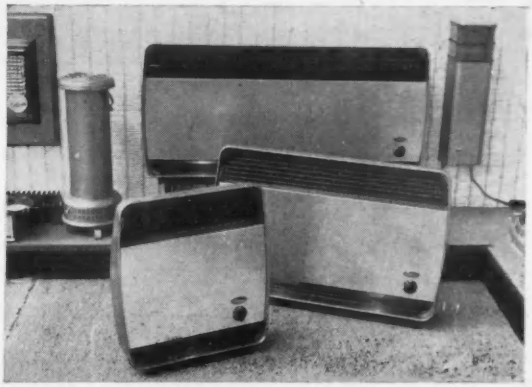
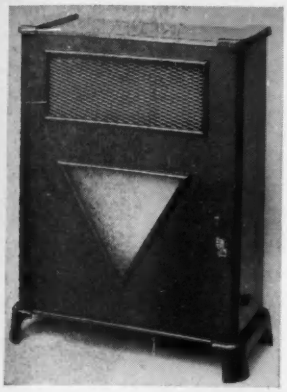


Manufacturer	Name or Model	Type	Size (H.W. & D.) in inches	Element Loading	Method of Control	Casing	Finish	Price (excl. tax)	Purchase Tax
BESCOL (ELECTRIC), LTD., 118, Parkfield Road, Saltley, Birmingham, 8.	244 and 245	Portable	28×18¾×6½	2 kW	Switch (244) or thermostat (245)	Steel	Various colours	£6 17 0 (244) £8 14 0 (245)	£1 9 8 (244) £1 11 5 (245)
	"Contemporary" 270 and 272	Portable	28×18¼×8	2 kW	Switch (270) or thermostat (272)	Steel	Shades of beige	£5 17 6 (270) £6 12 6 (272)	£1 5 5 (270) £1 8 8 (272)
CENTURY CONVECTORS, LTD., Waterloo Road, Clitheroe, Lancs.	"Century" A.1	Portable	21×25¾×10	3 kW	3-heat rotary switch and thermostat	Steel plate and vitreous cast iron	Vitreous enamel	£20 3 0	£4 7 3
	"Century" B.1	Portable	21×13×10	1½ kW	Two tumbler switches and thermostat	Steel plate and vitreous cast iron	Vitreous enamel	£12 11 3	£2 14 5
E. K. COLE, LTD., Heating Division, 5, Vigo Street, London, W.1.	FRC1	Portable	23×16½×9½	1 kW	Thermostatic	Plastic	Polished walnut or black (ivory, beige or red 5s extra plus 1s 1d P.T.)	£10 0 0	£2 3 4
	FR2 and FRC2	Portable	23×25½×9½	2 kW	Half-heat (FR2) thermostatic (FRC2)	Plastic	Polished walnut or black (ivory, beige or red 7s 6d extra plus 1s 8d P.T.)	£11 10 0 (FR2) £12 10 0 (FRC2)	£2 9 10 (FR2) £2 14 2 (FRC2)
	K2 and KC2	Portable	23½×23×7½	2 kW	Half-heat (K2) thermostatic (KC2)	Steel	Hammered bronze stoved enamel	£7 0 0 (K2) £7 10 0 (KC2)	£1 10 4 (K2) £1 12 6 (KC2)
	SR15 and SRC15	Portable or wall fixing	23×15½×8½	1½ kW	None (SR15) thermostatic (SRC15)	Steel	Light bronze stoved enamel	£7 15 0 (SR15) £9 5 0 (SRC15)	£1 13 7 (SR15) £2 0 1 (SRC15)
	SR2 and SRC2	Portable or wall fixing	23×24½×8½	2 kW	Half-heat (SR2) thermostatic (SRC2)	Steel	Light bronze stoved enamel	£10 0 0 (SR2) £11 0 0 (SRC2)	£2 3 4 (SR2) £2 7 8 (SRC2)
	SR3 and SRC3	Portable or wall fixing	23×24½×8½	3 kW	Half-heat (SR3) thermostatic (SRC3)	Steel	Light bronze stoved enamel	£11 0 0 (SR3) £12 0 0 (SRC3)	£2 7 8 (SR3) £2 12 0 (SRC3)
	B1 and BC1	Inset	22½×14½×1⅞ (panel) 18½×12⅝×5½ (recess)	1 kW	External switch required (B1) thermostatic (BC1)	Plastic panel, steel grilles	Walnut or black panels (ivory, beige or red 10s 0d extra plus 2s 2d P.T.)	£11 0 0 (B1) £12 10 0 (BC1)	£2 7 8 (B1) £2 14 2 (BC1)
	B2 and BC2	Inset	22½×23½×1⅞ (panel) 18½×21×5½ (recess)	2 kW	External switch required (B2) thermostatic (BC2)	Plastic panel, steel grilles	Walnut or black panels (ivory, beige or red 15s extra plus 3s 3d P.T.)	£13 10 0 (B2) £15 0 0 (BC2)	£2 18 6 (B2) £3 5 0 (BC2)
	RGP1	Radiant glass wall panel	21¼×30½×3	1 kW	External switch required, built-in switch available to order	Armour plate glass	Light bronze frame	£10 15 6	£2 6 9
	MRL1 and MRL1/TC	Wall mounting	20×13¾×6	1 kW	None (1) thermostatic (1/TC)	Steel	Light bronze stoved enamel	£7 10 0 (1) £8 15 0 (1/TC)	£1 12 6 (1) £1 17 11 (1/TC)
	MRL2 and MRL2/TC	Wall mounting	20×24×6	2 kW	None (2) thermostatic (2/TC)	Steel	Light bronze stoved enamel	£10 10 0 (2) £11 15 0 (2/TC)	£2 5 6 (2) £2 10 11 (2/TC)
CRANMER & CHESHIRE, LTD., Steward Street, Spring Hill, Birmingham, 18.	"Nichro" 444	Portable	25×20×8½	2 kW	Half-heat switch (a) or thermostatic (b)	Steel, glass panel	Gold bronze, illuminated glass panel	£9 10 0 (a) £10 15 8 (b)	£2 1 10 (a) £2 7 6 (b)
CROSSLANDS (RUGELEY), LTD., 55, Ebury Street, London, S.W.1.	900/1	Portable	22½×23½×3½–5	1 kW	—	Steel	Old gold or antique bronze	£6 12 6	£1 8 8
	900/2	Portable	22½×23½×3½–5	2 kW	Half-heat switch or variable thermostat	Steel	Old gold or antique bronze	£8 0 0 (switched) £9 5 0 (thermostat)	£1 14 8 (switched) £2 0 1 (thermostat)
	900/3	Portable	22½×23½×3½–5	2 kW	3-heat switch	Steel	Old gold or antique bronze	£8 18 0	£1 18 7
DEXRAY ENGINEERING CO., LTD., 14, Ardwick Green South, Manchester, 13.	C.20	Portable	25×18×6	2 kW	On/off switch	Steel	Stove enamelled	£7 13 4	£1 14 6
	C.22	Portable	25×18×8	2 kW	On/off switch	Steel	Stove enamelled	£7 18 0	£1 15 6
	C.20/W	Wall mounting	23×18×7½	2 kW	On/off switch	Steel	Stove enamelled	£7 18 0	£1 15 6



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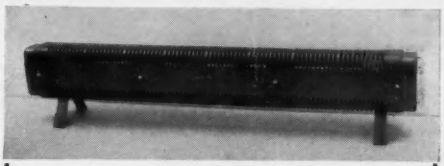

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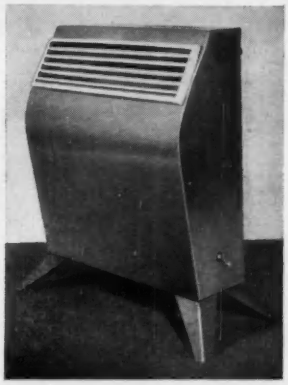

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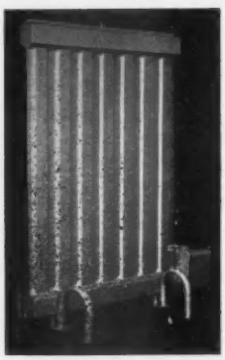
6. *Cranmer & Cheshire "Nichro" 444 illuminated convector*
7. *Dimplex skirting board styled convector heater*
8. *Dexray model C.22 convector*
9. *Crossland 900/2 convector*
10. *Bescol model 272 "Contemporary" heater*
11. *E. K. Cole model KC2 2 kW convector*

Manufacturer	Name or Model	Type	Size (H.W. & D.) in inches	Element Loading	Method of Control	Casing	Finish	Price (excl. tax)	Purchase Tax
DIMPLEX, LTD., Millbrook, Southampton.	A.38	Panel, oil-filled: supplied with feet or wall brackets. Castor wheels extra	20½ (+2 with feet) × 26 × 7½ (feet), 3½ (brackets) or 12 (castors)	500 W	Thermostatic, pilot light	Sheet steel	Stoved enamel, eight colours	£10 0 0	£2 3 9
	B.48	Panel, oil-filled: supplied with feet or wall brackets. Castor wheels extra	26½ (+2 with feet) × 26 × 7½ (feet), 3½ (brackets) or 12 (castors)	750 W	Thermostatic, pilot light	Sheet steel	Stoved enamel, eight colours	£12 0 0	£2 12 9
	B.310	Panel, oil-filled: supplied with feet or wall brackets. Castor wheels extra	20½ (+2 with feet) × 31½ × 7½ (feet), 3½ (brackets) or 12 (castors)	750 W	Thermostatic, pilot light	Sheet steel	Stoved enamel, eight colours	£12 0 0	£2 12 9
	B.216	Panel, oil-filled: supplied with feet or wall brackets. Castor wheels extra	14½ (+2 with feet) × 47½ × 7½ (feet), 3½ (brackets) or 12 (castors)	750 W	Thermostatic, pilot light	Sheet steel	Stoved enamel, eight colours	£12 0 0	£2 12 9
	C.412	Panel, oil-filled: supplied with feet or wall brackets. Castor wheels extra	26½ (+2 with feet) × 36½ × 7½ (feet), 3½ (brackets) or 12 (castors)	1 kW	Thermostatic, pilot light	Sheet steel	Stoved enamel, eight colours	£14 0 0	£3 1 6
	C.220	Panel, oil-filled: supplied with feet or wall brackets. Castor wheels extra	14½ (+2 with feet) × 57½ × 7½ (feet), 3½ (brackets) or 12 (castors)	1 kW	Thermostatic, pilot light	Sheet steel	Stoved enamel, eight colours	£14 0 0	£3 1 6
	ER.316	Panel, oil-filled: supplied with feet or wall brackets. Castor wheels extra	20½ (+2 with feet) × 47½ × 7½ (feet), 3½ (brackets) or 12 (castors)	1½ kW	Thermostatic, pilot light	Sheet steel	Stoved enamel, eight colours	£16 0 0	£3 10 3
	D.416	Panel, oil-filled: supplied with feet or wall brackets. Castor wheels extra	26½ (+2 with feet) × 47½ × 7½ (feet), 3½ (brackets) or 12 (castors)	1½ kW	Thermostatic, pilot light	Sheet steel	Stoved enamel, eight colours	£18 0 0	£3 19 0

Manufacturer	Name or Model	Type	Size (H.W. & D.) in inches	Element Loading	Method of Control	Casing	Finish	Price (excl. tax)	Purchase Tax
DIMPLEX, LTD., Millbrook, Southampton. *(continued)*	D.320	Panel, oil-filled: supplied with feet or wall brackets. Castor wheels extra	20½ (+2 with feet) × 57½ × 7½ (feet), 3½ (brackets) or 12 (castors)	1½ kW	Thermostatic, pilot light	Sheet steel	Stoved enamel, eight colours	£18 0 0	£3 19 0
	E.420	Panel, oil-filled: supplied with feet or wall brackets. Caster wheels extra	26½ (+2 with feet) × 57½ × 7½ (feet), 3½ (brackets) or 12 (castors)	2 kW	Thermostatic, pilot light	Sheet steel	Stoved enamel, eight colours	£22 0 0	£4 16 6
	100	Column, oil-filled: supplied with feet or wall fixing bolt. Castor wheels extra	21 (+3½ with feet) × 21½ × 6 (feet) or 12 (castors)	1 kW	Thermostatic, pilot light	Steel	Stoved enamel, eight colours	£16 10 0	£3 12 6
	140	Column, oil-filled: supplied with feet or wall fixing bolt. Castor wheels extra	21 (+3½ with feet) × 27½ × 6 (feet) or 12 (castors)	1½ kW	Thermostatic, pilot light	Steel	Stoved enamel, eight colours	£20 10 0	£4 10 0
	180	Column, oil-filled: supplied with feet or wall fixing bolt. Castor wheels extra	21 (+3½ with feet) × 34½ × 6 (feet) or 12 (castors)	2 kW	Thermostatic, pilot light	Steel	Stoved enamel, eight colours	£25 10 0	£5 12 0
	270	Column, oil-filled: supplied with feet or wall fixing bolt. Castor wheels extra	21 (+3½ with feet) × 45 × 6 (feet) or 12 (castors)	3 kW	Thermostatic, pilot light	Steel	Stoved enamel, eight colours	£35 0 0	£7 13 6
	ETC.210	Panel, oil-filled: supplied with feet or wall brackets	14⅞ × 30½ × 2½ (brackets) or 5⅞ (feet)	450 W	Excess temperature cut-out	Sheet steel	Stoved enamel, eight colours	£7 10 0	£1 13 0
	SBS 300/W (a) SBS 300/F (b) SBS 500/W (c) SBS 500/F (d)	Skirting board	5 × 24 × 2½ (a) 7½ × 24 × 4½ (b) 5 × 36 × 2½ (c) 7½ × 36 × 4½ (d)	300 W (a and b) 500 W (c and d)	—	Sheet steel	Stoved enamel, eight colours	£3 17 6 (a) £4 2 6 (b) £4 12 6 (c) £4 17 6 (d)	£0 17 0 (a) £0 18 0 (b) £1 0 3 (c) £1 1 6 (d)
THOS. DRYDEN & SON, LTD., Grimshaw Street, Preston.	"AIRO-S" ARO/500/S and ARO/750/S	Portable	18¼ × 13½ × 2	500 W and 750 W	Switch	Steel	Cream, silver, green, brown, grey and white	£3 17 6 (500 W) £4 2 6 (750 W)	£0 17 0 (500 W) £0 18 2 (750 W)
	"AIRO-S" ARO/1000/S and ARO/1500/S	Portable	18½ × 27 × 2	1 & 1½ kW	Switch	Steel	Cream, silver, green, brown, grey and white	£6 7 6 (1 kW) £6 15 0 (1½ kW)	£1 8 0 (1 kW) £1 9 8 (1½ kW)
	"AIRO-LS" ARO/250/LS, ARO/500/LS and ARO/750/LS	Portable, Low surface temperature only	18¼ × 13½ × 2 (250 W) 18½ × 27 × 2 (500 and 750 W)	250 W, 500 W and 750 W	Switch	Steel	Cream, silver, green, brown, grey and white	£3 17 6 (250 W) £6 2 6 (500 W) £6 7 6 (750 W)	£0 17 0 (250 W) £1 6 9 (500 W) £1 8 0 (750 W)
DULRAE, LTD., Griffin Lane, Aylesbury, Bucks.	"Medrae" CS	Panel, wall or ceiling mounting	23⅞ × 11⅞ × ½	175 W	Thermostatic	Non-metallic	Grey/brown	£1 15 0	£0 7 8
	"Medrae" CT	Panel, wall or ceiling mounting	23⅞ × 15⅞ × ½	250 W	Thermostatic	Non-metallic	Grey/brown	£2 0 0	£0 8 9
	"Medrae" CU	Panel, wall or ceiling mounting	23⅞ × 23⅞ × ½	425 W	Thermostatic	Non-metallic	Grey/brown	£2 12 4	£0 11 6
	"Medrae" CV	Panel, wall or ceiling mounting	31⅞ × 11⅞ × ½	250 W	Thermostatic	Non-metallic	Grey/brown	£2 0 0	£0 8 9
	"Medrae" CW	Panel, wall or ceiling mounting	31⅞ × 23⅞ × ½	550 W	Thermostatic	Non-metallic	Grey/brown	£3 5 0	£0 14 3
	"Medrae" CX	Panel, wall or ceiling mounting	47⅞ × 7⅞ × ½	250 W	Thermostatic	Non-metallic	Grey/brown	£2 0 0	£0 8 9
	"Medrae" CY	Panel, wall or ceiling mounting	47⅞ × 11⅞ × ½	400 W	Thermostatic	Non-metallic	Grey/brown	£2 12 4	£0 11 6
	"Medrae" CZ	Panel, wall or ceiling mounting	47⅞ × 23⅞ × ½	850 W	Thermostatic	Non-metallic	Grey/brown	£4 9 4	£0 19 7
	Note: All above panels are usually de-rated to half or one-quarter of the standard loadings for ceiling applications.								
ELECTROWAY HEATERS, LTD., Loughborough, Leics.	81 and 81S	Portable. Can be converted to wall mounting	25 × 15 × 10	1 kW	Half-heat switch (81S only)	Sheet steel	Golden beige	£4 19 6 (81) £5 7 0 (81S)	£1 2 0 (81) £1 3 7 (81S)
	82T and 83T	Portable. Can be converted to wall mounting	25 × 26 × 10	2 kW and 3 kW	Thermostatic	Sheet steel	Golden beige	£7 18 0 (82T) £11 5 0 (83T)	£1 14 11 (82T) £2 9 6 (83T)

Manufacturer	Name or Model	Type	Size (H.W. & D.) in inches	Element Loading	Method of Control	Casing	Finish	Price (excl. tax)	Purchase Tax
FALKIRK IRON CO., LTD., P.O. Box No. 4, Falkirk.	"Falco" 206	Portable	17⅜×25½×6½	1 kW	Wired direct to plug	Steel	Stoved enamel, various colours	£6 8 6	£1 8 2
	"Firefly" 80	Portable	21½×14½×6½	1 kW	Wired direct to plug	Steel	Stoved enamel, various colours	£5 4 0	£1 2 9
FALK, STADELMANN & CO., LTD., 91, Farringdon Road, London, E.C.1.	"Caprice" U.95715	Portable panel	20⅛×22⅜×3⅜	2 kW	Step	Steel	Vitreous enamelled in five contemporary colours. Chromium feet and band	£10 8 6	£2 5 9
H. FROST & CO., LTD., Fieldgate, Walsall.	"Sunhouse" 5100	Portable	22½×8×8	1 kW	Half or full-heat a.c. switch	Pressed steel	Copper bronze	£4 12 0	£1 0 10
	"Sunhouse" 5200 and 5201	Portable	22½×16×8	2 kW	Half or full-heat a.c. switch (5200) Thermostatic (5201)	Pressed steel	Copper bronze	£6 10 10 (5200) £7 10 0 (5201)	£1 10 4 (5200) £1 14 4 (5201)
G.B.M. (ELECTRICAL) BIRMINGHAM, LTD., 439, Moseley Road, Birmingham, 12.	P.1	Panel oil-filled	27½×21½×2	500 W	Thermostatic	Pressed steel	Hammered gold	£9 5 0	£2 0 7
	P.2	Panel oil-filled	27½×28⅛×2	750 W	Thermostatic	Pressed steel	Hammered gold	£11 10 0	£2 10 5
	P.3	Panel oil-filled	27½×35½×2	1 kW	Thermostatic	Pressed steel	Hammered gold	£13 10 0	£2 19 3
	P.4	Panel oil-filled	27½×49⅞×2	1½ kW	Thermostatic	Pressed steel	Hammered gold	£16 17 6	£3 14 0
	P.5	Panel oil-filled	33½×61⅝×2	2 kW	Thermostatic	Pressed steel	Hammered gold	£21 10 0	£4 14 4
	C.1	Column oil-filled	18 (+2 for castors) ×21×5	500 W	Thermostatic	Steel	Hammered gold	£9 17 6	£2 3 4
	C.2	Column oil-filled	24 (+2 for castors) ×24½×5	1 kW	Thermostatic	Steel	Hammered gold	£15 10 0	£3 8 0
	C.3	Column oil-filled	24 (+2 for castors) ×35½×5	1½ kW	Thermostatic	Steel	Hammered gold	£19 10 0	£4 5 6
	C.4	Column oil-filled	24 (+2 for castors) ×44×5	2 kW	Thermostatic	Steel	Hammered gold	£24 10 0	£5 7 6
GENERAL ELECTRIC CO., LTD., Magnet House, Kingsway, London, W.C.2.	D.2802	Portable	27×17×7	1 kW	On-off switch	Steel	Hammered bronze	£5 6 2	£1 3 4
	D.2804	Portable	27×23×7	2 kW	Thermostatic	Steel	Hammered bronze	£8 6 1	£1 16 5
	D.2842	Portable	21½×26½×8½	2 kW	Thermostatic	Steel with "Expamet" grille	Black and gold	£7 19 11	£1 15 1



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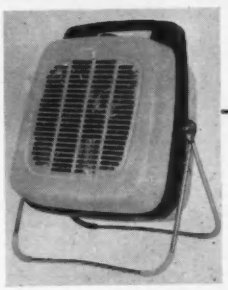

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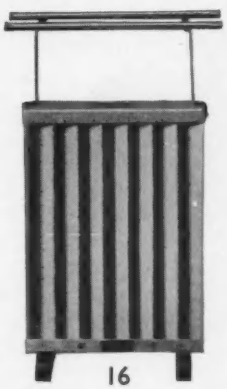

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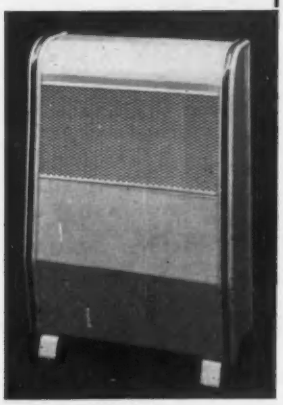
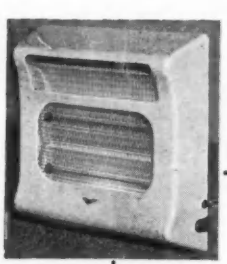
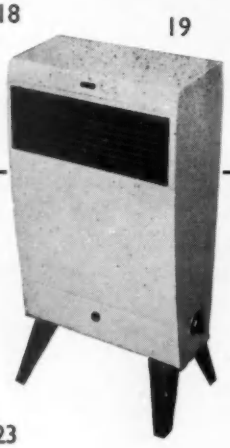
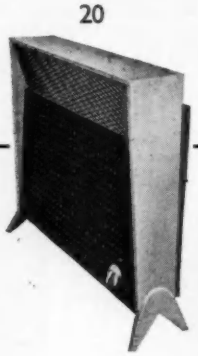


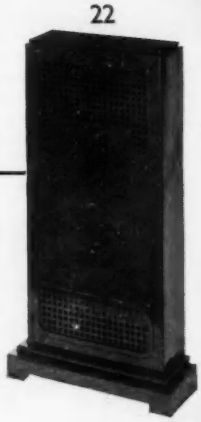
12. *G.B.M. oil-filled radiator*
13. *G.E.C. model DM.248 fan heater*
14. *Electroway Heaters model 83T convector heater*
15. *Falk, Stadelmann "Caprice" panel convector*
16. *Thos. Dryden "Airo" 500 W radiator*
17. *Falkirk Iron Co.'s "Firefly" 80 convector*

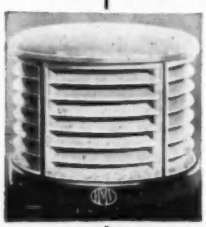
Manufacturer	Name or Model	Type	Size (H.W. & D.) in inches	Element Loading	Method of Control	Casing	Finish	Price (excl. tax)	Purchase Tax
GENERAL ELECTRIC CO., LTD., Magnet House, Kingsway, London, W.C.2. *(continued)*	D.2805	Portable or wall mounting	25×27×6½	1·5 kW	Thermostatic	Sheet metal frame with "Expamet" grille	Black, gold and burgundy	£11 13 9	£2 11 3
	DM.248	Portable or wall mounting fan heater	15×12×7½	2 kW	Fan direct to the mains, switches for 1 or 2 kW	Sheet steel with chromium legs	Grey with black handle	£9 14 9	£2 2 9
L. G. HAWKINS & CO., LTD., 30-35, Drury Lane, London, W.C.2.	LGH.452	Portable	28½×12×8½	1 kW	—	Sheet steel	Pink, eau-de-nil, ivory, gold, white or mushroom	£5 5 9	£1 3 2
	LGH.453S	Portable	28½×14×8½	2 kW	Switch	Sheet steel	Pink, eau-de-nil, ivory, gold, white or mushroom	£7 4 11	£1 11 9
	LGH.454T	Portable	28½×14×8½	2 kW	Thermostatic	Sheet steel	Pink, eau-de-nil, ivory, gold, white or mushroom	£7 18 2	£1 14 8
	"Sunray" LGH.451	Portable	21×13×6	1 kW	—	Sheet steel	Hammered gold and ivory	£4 17 0	£1 1 3
	"Sunray" de-luxe LGH.456T	Portable	28½×14×8½	2 kW	Thermostatic	Sheet steel	Hammered gold and ivory	£10 18 11	£2 8 0
	"Sunray" de-luxe LGH.455T	Portable	28½×19½×8½	3 kW	Thermostatic	Sheet steel	Hammered gold and ivory	£18 4 11	£4 0 1
HEATOVENT ELECTRIC, LTD., Lomond Street, Glasgow, N.2.	Metal	Portable	16×15½×5½ to 23×24×6	1 to 3 kW	Full or half-heat switches or thermostatic	Steel	Brown, gold or bronze	£7 0 0 to £14 0 0	£1 10 10 to £3 1 7
	Console	Portable	23×21⅝×6½	2 kW	Full or half-heat switches or thermostatic	Wood veneer	Mahogany, walnut or oak or bird's eye maple	£12 0 0 (m.w. or o.) £15 0 0 (maple)	£2 12 10 (m.w. or o.) £3 6 0 (maple)

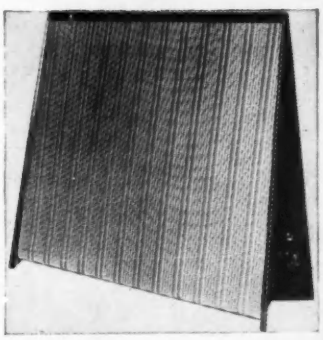








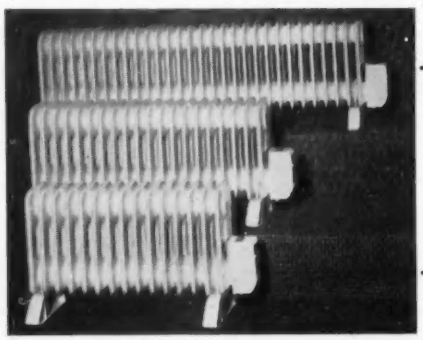




18. *Hobourn wall-mounting model*
19. *Hawkins model LGH.454T 2 kW convector*
20. *H.V.E. (Electric) "Bournemouth" convector*
21. *Hotpoint model 6025/6 convector*
22. *Heatrae floor mounting convector*
23. *H.M.V. "Cavendish" fan heater*
24. *Heatovent console convector*
25. *Hi-Fi "Hi-Stat" fan heater*
26. *G.E.C. model D.2842 convector*

Manufacturer	Name or Model	Type	Size (H.W. & D.) in inches	Element Loading	Method of Control	Casing	Finish	Price (excl. tax)	Purchase Tax
HEATRAE, LTD., Heatrae Works, Norwich.	321	Floor mounting	34½×18½×6½	1 kW	By arrangement	Steel	Brown or bronze	£10 2 0	£2 4 4
	322	Floor mounting	34½×29×6½	2 kW	By arrangement	Steel	Brown or bronze	£16 5 0	£3 11 4
	323	Floor mounting	34½×41×6½	3 kW	By arrangement	Steel	Brown or bronze	£19 19 0	£4 7 7
	2410	Wall mounting	30½×14×5	1 kW	By arrangement	Steel	Brown or bronze	£9 10 0	£2 1 9
	2420	Wall mounting	30½×26×5	2 kW	By arrangement	Steel	Brown or bronze	£15 8 6	£3 7 8
	2430	Wall mounting	30½×38×5	3 kW	By arrangement	Steel	Brown or bronze	£18 17 0	£4 2 9
	PC2/A	Floor mounting	24×18×7	2 kW	Hand switch	Steel	Lustre mushroom	£8 0 6	£1 15 3
	PC2/B	Floor mounting	24×18×7	2 kW	Thermostatic	Steel	Lustre mushroom	£8 15 1	£1 18 6
HERGA ELECTRIC HEATING SYSTEMS, 1-5, Northolt Road, Harrow, Middx.	1622/2H	Wall mounting panel	24½×34×1½	700 W	Separate thermostat	Plastics panel	To requirements on site	£5 4 0	£1 2 9
	1622/3H	Wall mounting panel	24½×50½×1½	1 kW	Separate thermostat	Plastics panel	To requirements on site	£7 14 0	£1 13 8
	1622/6H	Wall mounting panel	24½×100×1½	2 kW	Separate thermostat	Plastics panel	To requirements on site	£15 4 0	£3 6 5
	1622/2C	Ceiling mounting panel	23½×34 (ceiling area)	500 W	Separate thermostat	Plastics panel	To requirements on site	£5 12 0	£1 4 6
	1622/3C	Ceiling mounting panel	23½×50½ (ceiling area)	750 W	Separate thermostat	Plastics panel	To requirements on site	£8 6 0	£1 16 4
	1622/4C	Ceiling mounting panel	23½×67 (ceiling area)	1 kW	Separate thermostat	Plastics panel	To requirements on site	£11 0 0	£2 8 2
HI-FI, LTD., Derry Street, Brierley Hill, Staffs.	"Hi-Zee"	Fan heater	14×9½×6	1 & 2 kW	Switch (4 warm air and 2 cold air positions)	Steel	Stove enamelled, beige and ivory	£6 15 0	£1 9 7
	"Hi-Stat"	Fan heater	14×9½×6	1 & 2 kW	Switch (4 warm air and 2 cold air positions) and thermostat	Steel	Stove enamelled, beige and ivory	£8 8 0	£1 16 10
H.M.V. HOUSEHOLD APPLIANCES, Hayes, Middx.	"Cavendish" HC.2 and HCS.2	Fan heater	11¼×13½×11	2 kW	Unswitched (HC.2) Half-heat and heat-off switch (HCS.2)	Plastic, metal base	Cream and black, cream and brown or walnut	£8 8 1 (HC.2) £8 16 3 (HCS.2)	£1 16 11 (HC.2) £1 18 9 (HCS.2)
	"Salisbury" HC.4 and HCT.4	Fan heater	15×11×7	2 kW	3 fan speeds, 3-heat switch	Metal, plastic base	Stone and black, red and black or gold and ivory	£6 17 9 (HC.4) £8 3 7 (HCT.4)	£1 10 3 (HC.4) £1 15 11 (HCT.4)
HOBOURN DOMESTIC APPLIANCES, LTD., Strood, Rochester, Kent.	W.H./1, W.H./2 and W.H./3	Wall mounting	18×19¾×4¾	1½ kW	On/off (W.H./1) Unswitched (W.H./2) Thermostat (W.H./3)	Steel	Stoved enamel colours	£5 16 0 (W.H./1) £5 5 0 (W.H./2) £6 10 0 (W.H./3)	£1 5 5 (W.H./1) £1 3 0 (W.H./2) £1 8 6 (W.H./3)
	P.W.H./2	Portable	22½×19¼×5	1½ kW	Unswitched	Steel	Ivory or hammered gold	£6 8 0	£1 8 1
	P.W.H./1 and P.W.H./3	Portable	22½×19¼×5	2 kW	Half-heat switch (P.W.H./1) Thermostat (P.W.H./3)	Steel	Ivory or hammered gold	£6 18 0 (P.W.H./1) £7 10 0 (P.W.H./3)	£1 10 3 (P.W.H./1) £1 12 11 (P.W.H./3)
	P.N.H./3 and P.C.H./2	Portable safety heater	17×19×5½	1,200 W	Safety cut-out	Steel	Pink or blue (P.N.H./3) or mushroom (P.C.H./2)	£6 10 0	£1 8 6
	"Ocean" 1	Oil-filled radiator	24½×19¾×8	720 W	3-heat switch	Steel	Cream stoved enamel	£15 17 0	£3 9 7
	"Ocean" 2	Oil-filled radiator	26×26×8	1,200 W	3-heat switch	Steel	Cream stoved enamel	£17 5 10	£3 15 10
	"Ocean" 3	Oil-filled radiator	28×31½×8	1½ kW	3-heat switch	Steel	Cream stoved enamel	£20 12 1	£4 10 5
HOTPOINT ELECTRIC APPLIANCE CO., LTD., Crown House, Aldwych, W.C.2.	6020/1	Portable	24×18×7⅞	2 kW	Switched	Sheet metal	Bronze or silver grey hammer finish	£7 15 0	£1 14 0
	6025/6	Portable	24×18×7⅞	2 kW	Thermostatic	Sheet metal	Bronze or silver grey hammer finish	£8 12 2	£1 17 10

Manufacturer	Name or Model	Type	Size (H.W. & D.) in inches	Element Loading	Method of Control	Casing	Finish	Price (excl. tax)	Purchase Tax
C. HOUNSLOW & CO., LTD., Chalex Works, Southwick, Sussex.	"Standard" 1 and 1.T.	Portable	27×14×9½	1 kW	Unswitched (1) Thermostat (1.T.)	Steel	Hammered beige	£6 16 6 (1) £9 7 5 (1.T.)	£1 10 1 (1) £2 1 4 (1.T.)
	"Standard" 2, 2.T. and 2.T.S.	Portable	27×16×9½	2 kW	Half-heat switch (2) Thermostat (2.T.) Thermostat and switch (2.T.S.)	Steel	Hammered beige	£8 10 8 (2) £10 5 10 (2.T.) £11 3 2 (2.T.S.)	£1 17 7 (2) £2 5 5 (2.T.) £2 9 3 (2.T.S.)
	"Standard" 9, 9.T. and 9.T.S.	Portable	27×16×9½	3 kW	Half-heat switch (9) Thermostat (9.T.) Thermostat and switch (9.T.S.)	Steel	Hammered beige	£10 2 2 (9) £11 17 4 (9.T.) £12 14 8 (9.T.S.)	£2 4 7 (9) £2 12 4 (9.T.) £2 16 2 (9.T.S.)
	"Superb" 21, 21.T. and 21.T.S.	Portable	30×16×9½	2 kW	Half-heat switch (21) Thermostat (21.T.) Thermostat and switch (21.T.S.)	Steel	Hammered antique gold, gilt louvres	£9 18 6 (21) £11 13 8 (21.T.) £12 11 0 (21.T.S.)	£2 3 9 (21) £2 11 6 (21.T.) £2 5 4 (21.T.S.)
	"Superb" 22, 22.T. and 22.T.S.	Portable	30×16×9½	3 kW	Half-heat switch (22) Thermostat (22.T.) Thermostat and switch (22.T.S.)	Steel	Hammered antique gold, gilt louvres	£11 10 0 (22) £13 5 2 (22.T.) £14 2 6 (22.T.S.)	£2 10 9 (22) £2 18 5 (22.T.) £3 2 4 (22.T.S.)
	"De Luxe" 3, 3.T. and 3.T.S.	Portable	27½×16½×9	2 kW	Half-heat switch (3) Thermostat (3.T.) Thermostat and switch (3.T.S.)	Steel	Hammered beige and black	£11 0 0 (3) £12 15 2 (3.T.) £13 12 6 (3.T.S.)	£2 8 6 (3) £2 16 3 (3.T.) £3 0 1 (3.T.S.)
	"Dual Purpose" 24	Portable radiant/convector	27×16×9½	1 kW convection and 1 kW radiant	Separate switches	Steel	Hammered beige	£10 10 0	£2 6 3
	"Dual Purpose" 25	Portable radiant/convector	27×16×9½	2 kW convection and 1 kW radiant	Separate switches	Steel	Hammered beige	£11 3 2	£2 9 3
	"Triangle" 4	Portable (corner fitting)	32×21×10½	2 kW	Half-heat switch	Steel	Bronze and black	£9 6 5	£2 1 1
	"Wall Type" 5 and 6	Wall fixing	23½×17×5½	1 kW (5) 2 kW (6)	Switch	Steel	Bronze	£5 10 3 (5) £6 18 1 (6)	£1 4 3 (5) £1 10 6 (6)
	"Dual Purpose Wall Type" 12	Wall fixing radiant/convector	23½×17×5½	1 kW convection and 1 kW radiant	Separate switches	Steel	Bronze	£8 5 5	£1 16 6
	"Dual Purpose Wall Type" 15	Wall fixing radiant/convector	23½×17×5½	2 kW convection and 1 kW radiant	Separate switches	Steel	Bronze	£9 16 11	£2 3 5
	"Panel Inset" 7, 8 and 16	Flush wall fitting	19½×21½×1½	2 kW	Unswitched (8) Thermostat (7) Thermostat and switch (16)	Steel	Figured walnut or hammered beige	£9 8 3 (8) £11 7 7 (7) £14 0 1 (16)	£2 1 6 (8) £2 10 3 (7) £3 1 9 (16)
	"Panel Inset" 26, 27 and 29	Flush wall fitting	19½×21½×1½	3 kW	Unswitched (29) Thermostat (26) Thermostat and switch (27)	Steel	Figured walnut or hammered beige	£10 19 9 (29) £12 19 1 (26) £15 11 7 (27)	£2 8 6 (29) £2 17 2 (26) £3 8 9 (27)
	"Pixie" 18 and 19	Wall fixing	14½×12×4½	750 W (18) or 1 kW (19)	Switch	Steel	Hammered beige	£5 10 3 (18) £5 10 3 (19)	£1 4 3 (18) £1 4 3 (19)



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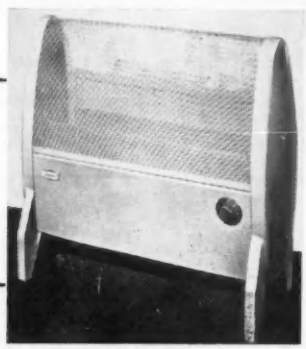

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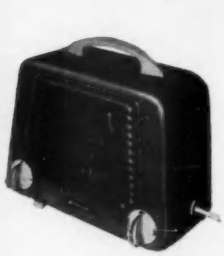
27. *"S" family of Hurseal radiators*

28. *Jackson type 777/6 "Heatwave" convector*

Manufacturer	Name or Model	Type	Size (H.W. & D.) in inches	Element Loading	Method of Control	Casing	Finish	Price (excl. tax)	Purchase Tax
C. HOUNSLOW & CO., LTD., Chalex Works, Southwick, Sussex. (continued)	"Standard Offset" 13, 14 and 17	Wall fixing	19⅛×21⅛×5⅛	2 kW	Unswitched (14) Thermostat (13) Thermostat and switch (17)	Steel	Figured walnut or hammered beige	£9 8 3 (14) £11 7 7 (13) £14 0 1 (17)	£2 1 6 (14) £2 10 3 (13) £3 1 9 (17)
	"Standard Offset" 32, 33 and 34	Wall fixing	19⅛×21⅛×5⅛	3 kW	Unswitched (34) Thermostat (32) Thermostat and switch (33)	Steel	Figured walnut or hammered beige	£10 19 9 (34) £12 19 1 (32) £15 11 7 (33)	£2 8 6 (34) £2 17 2 (32) £3 8 9 (33)
	"Albany" 35 and 35.T.	Portable	21×16×5½	1 kW	Unswitched (35) Thermostat (35.T.)	Steel	Hammered beige	£5 5 0 (35) £7 15 11 (35.T.)	£1 3 2 (35) £1 14 5 (35.T.)
	"Albany" 36, 36.T. and 36.T.S.	Portable	21×16×5½	2 kW	Half-heat switch (36) Thermostat (36.T.) Thermostat and switch (36.T.S.)	Steel	Hammered beige	£6 17 7 (36) £8 12 9 (36.T.) £9 10 1 (36.T.S.)	£1 10 4 (36) £1 18 2 (36.T.) £2 1 11 (36.T.S.)
	"Albany" Dual Purpose 37	Portable radiant/convector	21×16×5½	1 kW convection and 1 kW radiant	Separate switches	Steel	Hammered beige	£7 17 6	£1 14 9
HURSEAL, LTD., 229, Regent Street, London, W.1.	HM½ HM¾	Oil-filled panel portable	20×29×2¾ 20×41×2¾	½ kW ¾ kW	Built in thermostatic	Steel	Standard: bronze or cream stoved enamel. Eau-de-nil, sky blue, white, gold, etc., also available.	£9 16 6 £11 9 6	£2 3 1 £2 10 4
	TV½ TV¾ TV1 TV1½	Oil-filled panel portable	26×29×2¾ 26×29×2¾ 26×41×2¾ 26×52×2¾	½ kW ¾ kW 1 kW 1½ kW	Built in thermostatic	Steel		£9 16 6 £11 9 6 £13 18 9 £15 11 6	£2 3 1 £2 10 4 £3 1 2 £3 8 4
	HJ	Oil-filled 2-column portable	17×27×3¾	¾ kW	Built in thermostatic	Steel		£13 2 0	£2 17 6
	TV3	Oil-filled 3-column portable	28×17×5½	1 kW	Built in thermostatic	Steel		£16 7 6	£3 11 11
	J.05 J.75 J.10 J.15	Oil-filled 2-column portable, floor or wall fitting	17×20×3¾ 17×27×3¾ 17×38×3¾ 17×53×3¾	½ kW ¾ kW 1 kW 1½ kW	Built in thermostatic	Steel		£10 13 0 £13 2 0 £16 7 6 £21 6 0	£2 6 9 £2 17 6 £3 11 11 £4 13 6
	S.75 S.10 S.15	Oil-filled 3-column portable, floor or wall fitting	13⅜×22×5½ 13⅜×29×5½ 13⅜×42×5½	¾ kW 1 kW 1½ kW	Built in thermostatic	Steel		£13 2 0 £16 7 6 £21 6 0	£2 17 6 £3 11 11 £4 13 6
	F.11 F.12 F.13 F.14 F.15 F.16 F.17 F.18 F.19 F.20	Oil-filled 3-column, floor or wall fitting	21×14×5½ 21×22×5½ 24×20×5½ 28×17×5½ 21×31×5½ 24×28×5½ 28×25×5½ 21×41×5½ 24×36×5½ 28×31×5½	½ kW 1 kW 1 kW 1 kW 1½ kW 1½ kW 1½ kW 2 kW 2 kW 2 kW	Built in thermostatic	Steel		£10 13 0 £16 7 6 £16 7 6 £16 7 6 £20 10 0 £20 10 0 £20 10 0 £25 8 5 £25 8 5 £25 8 5	£2 6 9 £3 11 11 £3 11 11 £3 11 11 £4 9 11 £4 9 11 £4 9 11 £5 11 6 £5 11 6 £5 11 6
	P.1 P.2 P.3 P.4 P.5	Oil-filled panel, floor or wall fitting	18×29×2¾ 24×24×2¾ 18×52×2¾ 24×41×2¾ 30×36×2¾	½ kW ½ kW 1 kW 1 kW 1 kW	Built in thermostatic	Steel		£9 16 6 £9 16 6 £13 18 9 £13 18 9 £13 18 9	£2 3 1 £2 3 1 £3 1 2 £3 1 2 £3 1 2
	P.6 P.7 P.8 P.9 P.10	Oil-filled panel, floor or wall fitting	18×78×2¾ 24×59×2¾ 30×50×2¾ 30×69×2¾ 24×78×2¾	1½ kW 1½ kW 1½ kW 2 kW 2 kW	Built in thermostatic	Steel		£18 0 0 £18 0 0 £18 0 0 £21 6 0 £21 6 0	£3 19 0 £3 19 0 £3 19 0 £4 13 6 £4 13 6
	B.05 B.75 B.10 B.15	Oil-filled panel, floor or wall fitting	11×49×2¾ 11×78×2¾ 11×96×2¾ 11×144×2¾	¾ kW ¾ kW 1 kW 1½ kW	Built in thermostatic	Steel		£10 13 0 £13 2 0 £16 7 6 £21 6 0	£2 6 9 £2 17 6 £3 11 11 £4 13 6
H.V.E. (ELECTRIC), LTD., Viaduct Works, Kirkstall Road, Leeds, 4.	"Bournemouth" DC.1.P and DC.1.V	Portable	23×24×6½	1 kW	—	Wood with steel case	Pastel colours or veneer	£9 15 0 (DC.1.P) £11 0 0 (DC.1.V)	£2 3 10 (DC.1.P) £2 9 6 (DC.1.V)
	"Bournemouth" DC.2.P and DC.2.V	Portable	23×24×6½	2 kW	—	Wood with steel case	Pastel colours or veneer	£10 5 0 (DC.2.P) £11 10 0 (DC.2.V)	£2 6 1 (DC.2.P) £2 11 9 (DC.2.V)
	"Bournemouth" DCR.2.P and DCR.2.V	Portable	23×24×6½	2 kW	Energy regulator	Wood with steel case	Pastel colours or veneer	£11 5 0 (DCR.2.P) £12 10 0 (DCR.2.V)	£2 10 7 (DCR.2.P) £2 16 3 (DCR.2.V)
	"Bournemouth" DC.3.P and DC.3.V	Portable	23×24×6½	3 kW	—	Wood with steel case	Pastel colours or veneer	£12 15 0 (DC.3.P) £14 0 0 (DC.3.V)	£2 17 4 (DC.3.P) £3 3 0 (DC.3.V)
	"Bournemouth" DCR.3.P and DCR.3.V	Portable	23×24×6½	3 kW	Energy regulator	Wood with steel case	Pastel colours or veneer	£13 16 0 (DCR.3.P) £15 0 0 (DCR.3.V)	£3 1 7 (DCR.3.P) £3 7 6 (DCR.3.V)

Manufacturer	Name or Model	Type	Size (H.W. & D.) in inches	Element Loading	Method of Control	Casing	Finish	Price (excl. tax)	Purchase Tax
JACKSON ELECTRIC STOVE CO., LTD., Dallow Road, Luton.	"Masterpiece" 785	Portable	23 7/16 × 23 3/16 × 7	2 kW	Thermostatic	Steel and aluminium	Anodised gold, pale green, pale blue, peach or red aluminium frame and centre panel	£10 10 0	£2 6 1
	"Masterpiece" 786	Portable	23 7/16 × 23 3/16 × 7	2 kW	Switch	Steel and aluminium		£9 10 0	£2 1 8
	"Masterpiece" 787	Portable	23 7/16 × 20 3/16 × 7	1 kW	Thermostatic	Steel and aluminium		£9 10 0	£2 1 8
	"Masterpiece" 788	Portable	23 7/16 × 20 3/16 × 7	1 kW	Switch	Steel and aluminium		£8 10 0	£1 17 4
	"Heatwave" 777/6	Portable	18½ × 20½ × 8	2 kW	Thermostatic (777) or switch (776)	Sheet steel	Mushroom	£5 14 5 (777) £5 4 7 (776)	£1 5 1 (777) £1 2 11 (776)
KENWOOD MFG. CO., LTD., Hipley Street, Old Woking, Surrey.	"Activair" A.600	Fan heater	11½ × 12½ × 6½	2 kW	3-heat rotary switch	Sheet steel	Gold, green, blue or red	£9 9 5	£2 1 7
M. & J. LOSSOS & CO., LTD., 29-31, Beethoven Street, London, W.10.	"Kaloric Mayfair"	Cabinet	19⅞ × 12½ × 6½	750 W or 1 kW	Thermostat extra	Steel	Bronze or cream	£6 15 0 (bronze) £7 10 0 (cream)	£1 9 8 (bronze) £1 12 11 (cream)
	"Kaloric Mayfair"	Cabinet	25½ × 22 × 7	2 kW	Switch, thermostat extra	Steel	Bronze or cream	£10 10 0 (bronze) £11 10 0 (cream)	£2 6 1 (bronze) £2 10 6 (cream)
	"Kaloric Mayfair"	Cabinet	25½ × 22 × 7	3 kW	Switch, thermostat extra	Steel	Bronze or cream	£12 0 0 (bronze) £13 0 0 (cream)	£2 12 8 (bronze) £2 17 1 (cream)
	"Kaloric Sapphire"	Floor or wall mounting	21⅞ × 16½ × 5½	750 W or 1 kW	Thermostat extra	Steel	Beige and old gold	£8 0 0	£1 15 1
	"Kaloric Sapphire"	Floor or wall mounting	21⅞ × 25⅞ × 5½	2 kW or 3 kW	Switch, thermostat extra	Steel	Beige and old gold	£11 0 0 (2 kW) £14 0 0 (3 kW)	£2 8 3 (2 kW) £3 1 5 (3 kW)
MACKEY BOWLEY (STEEL-WORKERS), LTD., 21, Caledonian Road, London, N.1.	"Maybow" R.1	Portable or wall mounting	28 × 21 × 2½	¾ kW	Thermostatic	Tubular steel	Old gold stoved enamel	£7 2 8	£1 10 8
	"Maybow" R.2	Portable or wall mounting	28 × 25 × 2½	1 kW	Thermostatic	Tubular steel	Old gold stoved enamel	£8 0 0	£1 16 3
	"Maybow" R.3	Portable or wall mounting	28 × 33 × 2½	1½ kW	Thermostatic	Tubular steel	Old gold stoved enamel	£9 6 8	£1 19 11
	"Maybow" Bathroom	Wall mounting	27 × 23 × 2½	350 W	—	Tubular steel	White stoved enamel	£5 10 8	£1 4 0
MIDLAND ELECTRIC MFG. CO., LTD., Tyseley, Birmingham, 11.	"Memvair"	Portable	24 × 22 × 6½	1 kW	Unswitched (a) or thermostatic (b)	Steel	Bronze	£7 13 0 (a) £9 7 0 (b)	£1 13 7 (a) £2 1 0 (b)
	"Memvair"	Portable	24 × 22 × 6½	1½ kW	Switch (a) or thermostatic (b)	Steel	Bronze	£8 12 0 (a) £9 15 0 (b)	£1 17 9 (a) £2 2 9 (b)
	"Memvair"	Portable	24 × 32 × 6½	2 kW	Switch (a) or thermostatic (b)	Steel	Bronze	£12 10 0 (a) £13 13 0 (b)	£2 14 10 (a) £2 19 11 (b)
	"Circulair"	Portable	22½ × 7½ × 7½	1 kW	—	Steel	Bronze	£3 15 0	£0 16 5
	"Rotovair"	Portable	15½ × 12⅝ × 9⅝	2 kW	Switched	Wood	Walnut or mahogany	£8 15 0	£1 18 5
	"Memvek"	Portable	24 × 22 × 6⅞	2 kW	Switch (a) or thermostatic (b)	Steel	Bronze, mushroom, eau-de-nil, primrose	£6 7 0 (a) £7 7 0 (b)	£1 7 10 (a) £1 12 3 (b)
	"Memvek"	Wall mounting	21 × 22 × 5⅛	2 kW	Switch (a) or thermostatic (b)	Steel	Bronze, mushroom, eau-de-nil, primrose	£5 15 0 (a) £6 15 0 (b)	£1 5 3 (a) £1 9 7 (b)
	"Memrad"	Portable	26½ × 26½ × 7 without drying rail	1 kW	—	Steel	Mushroom, red fittings	£5 15 0 (without drying rail)	£1 5 3 (without drying rail)
MORPHY-RICHARDS, LTD., 50, Conduit Street, London, W.1.	RP/10	Portable	17½ × 18 × 6	1 kW	—	Steel	Warm bronze	£3 15 0	£0 16 3
	QU/10	Portable	27 × 17 × 9	1 kW	—	Steel	Warm bronze	£5 5 0	£1 2 9
	QS/20 and QT/20	Portable	27 × 22 × 9	2 kW	Half-heat switch (QS/20) Thermostatic (QT/20)	Steel	Warm bronze	£6 10 0 (QS/20) £7 5 0 (QT/20)	£1 8 2 (QS/20) £1 11 5 (QT/20)

Manufacturer	Name or Model	Type	Size (H.W. & D.) in inches	Element Loading	Method of Control	Casing	Finish	Price (excl. tax)	Purchase Tax
MORPHY-RICHARDS, LTD., 80, Conduit Street, London, W.1. (continued)	QR/20	Portable	27×17×9	1 kW (convector) 1 kW (radiant)	Switch for fire	Steel	Warm bronze	£7 0 0	£1 10 4
	QR/30	Portable	27×22×9	2 kW (convector) 1 kW (radiant)	Switch (fire) thermostatic (convector)	Steel	Warm bronze	£8 15 0	£1 17 11
	QBA/10	Portable (brackets supplied for wall mounting)	24×16×5½	1 kW	Thermostatic	Steel	Warm bronze	£6 10 0	£1 8 2
	QBA/20		24×31×5½	2 kW	Thermostatic	Steel	Warm bronze	£9 13 6	£2 1 11
NEW DAY ELECTRIC (SALES), LTD., Chalford, Nr. Stroud, Gloucester.	"Chalford"	Portable	24×7 dia.	1 kW	Half-heat switch	Steel	Hammered bronze	£3 17 11	£0 17 3
	"Gloucester"	Portable	25×8¼×8¼	1½ kW	Half-heat switch	Steel	Hammered bronze	£4 10 3	£1 0 0
	"Cotswold"	Portable wall mounting fan heater	13¼×11×7	1½ kW	Fan or element switch	Steel	Grey	£6 18 9	£1 10 6
	"Newday"	Free standing	23×18×9	Fan 1½ kW, convection 3 kW	Two-circuit switch, automatic time-switch	Steel	Dove grey, rich cream or venetian red	£20 10 0	£4 10 0
	"Westbury"	Portable	25×26×3	1 kW	Half-heat switch	Steel	Bronze, cream tubular legs	£7 19 6	£1 15 0
PANELEC (GT. BRITAIN), LTD., 21, Bloomsbury Street, London, W.C.1.	"Panelec"	Surface, wall panel	78¾×39½×1⅛ and 105¼×28½×1⅛	750 W	Room thermostat	Steel	Primer	£19 10 0	£5 17 0
	"Panelec"	Surface, wall panel	38¼×34×1⅛ (a) 36×64×1⅛ (b) 78¼×39½×1⅛ (c) 54×83×1⅛ (d)	380 W (a) 550 W (b) 750 W (c) 1090 W (d)	Room thermostat	Aluminium	Aluminium	£11 10 0 (a) £17 10 0 (b) £23 10 0 (c) £31 0 0 (d)	£3 9 0 (a) £5 5 0 (b) £7 1 0 (c) £9 0 3 (d)
REELEK APPLIANCES, LTD., Reelek Works, Baldock, Herts.	"Handy"	Portable	18×14×9½	1 kW	—	Steel	Mottled fawn, aluminium grille	£4 0 0	£0 17 4
	"Handy"	Portable	21½×20×9½	2 kW	Thermostatic	Steel	Mottled fawn, aluminium grille	£5 15 0	£1 4 11
	"Countess"	Portable	18×30×9½	2 kW	Thermostatic	Steel	Mottled fawn, aluminium grille	£8 4 0	£1 15 6



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29. *Kenwood "Activair" portable fan heater*
30. *Reelek 2 kW convector*
31. *New Day "Westbury" convector heater*
32. *Morphy-Richards model QBA/20 convector*
33. *M. & J. Lossos "Kaloric Sapphire" convector*
34. *MacKey Bowley model R2 oil-filled heater*
35. *M.E.M. "Circulair" portable heater*

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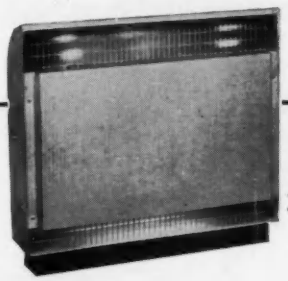

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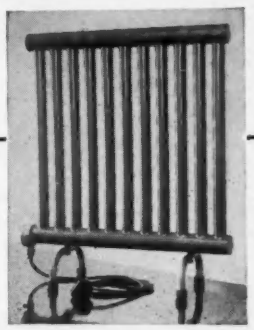

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Manufacturer	Name or Model	Type	Size (H.W. & D.) in inches	Element Loading	Method of Control	Casing	Finish	Price (excl. tax)	Purchase Tax
REMPLOY, LTD., 25-28, Buckingham Gate, London, S.W.1.	"Chill-chaser"	Oil-filled radiator	22×25¼×7	500 W	Thermostat	Steel	Walterised and stoved enamel	£9 5 0	£2 0 7
	"Chill-chaser"	Oil-filled radiator	30×33½×7	750 W	Thermostat	Steel	Walterised and stoved enamel	£11 5 0	£2 9 4
	"Chill-chaser"	Oil-filled radiator	38×41½×7	1 kW	Thermostat	Steel	Walterised and stoved enamel	£12 17 6	£2 16 6
REVO ELECTRIC CO., LTD., Tipton, Staffs.	FI4980	Portable	22⅛×15½×10⅛	1 kW	Unswitched	Steel	Welsh grey, pale gold or Cotswold stone	£5 5 0	£1 3 0
	FI4984 and FI4985	Portable	22⅛×19⅛×10⅛	2 kW	Half-heat switch (FI4984) or thermostat (FI4985)	Steel	Welsh grey, pale gold or Cotswold stone	£6 10 0 (FI4984) £7 5 0 (FI4985)	£1 8 6 (FI4984) £1 11 10 (FI4985)
	FI4982 and FI4983	Portable	22⅛×15½×10⅛	1 kW (convector) and 1 kW (radiant)	Switch (radiant) (FI4982) Switch (radiant) and thermostat (convector) (FI4983)	Steel	Welsh grey, pale gold or Cotswold stone	£7 17 6 (FI4982) £8 12 6 (FI4983)	£1 14 6 (FI4982) £1 17 10 (FI4983)
	FI4986 and FI4987	Portable	22⅛×19⅛×10⅛	2 kW (convector) and 1 kW (radiant)	Switch (radiant) (FI4986) Switch (radiant) and thermostat (convector) (FI4987)	Steel	Welsh grey, pale gold or Cotswold stone	£8 18 6 (FI4986) £9 13 6 (FI4987)	£1 19 2 (FI4986) £2 2 5 (FI4987)
SANTON, LTD., Somerton Works, Newport, Mon.	Santon	Fluid-filled column radiator	24⅛×18×6	1 kW	Thermostatic	Steel	Stone	£14 0 0	£3 1 11
	Santon	Fluid-filled column radiator	24⅛×28×6	1½ kW	Thermostatic	Steel	Stone	£18 5 0	£4 0 3
	Santon	Fluid-filled column radiator	24⅛×36×6	2 kW	Thermostatic	Steel	Stone	£23 0 0	£5 1 3
SIEMENS EDISON SWAN, LTD., 38-39, Upper Thames Street, London, E.C.4.	"Wafer" DI21L (a) and DI21S (b)	Wall mounting	24×13⅞×5⅛	1 kW	Unswitched (a) or switched (b)	Steel	Bronze or ivory	£7 7 0 (a) £8 3 0 (b)	£1 12 4 (a) £1 15 9 (b)
	"Wafer" DI22L (a), DI22S (b) and DI22H (c)	Wall mounting	24×23⅛×5⅛	2 kW	Unswitched (a), switched (b) or 3-heat switch (c)	Steel	Bronze or ivory	£9 10 0 (a) £10 6 0 (b) £11 2 0 (c)	£2 1 9 (a) £2 5 3 (b) £2 8 9 (c)
	"Wafer" DI23L (a) DI23S (b) and DI23H (c)	Wall mounting	24×23⅛×5⅛	1½ kW	Unswitched (a), switched (b) or 3-heat switch (c)	Steel	Bronze or ivory	£9 2 0 (a) £9 17 6 (b) £10 13 6 (c)	£2 0 0 (a) £2 3 5 (b) £2 6 10 (c)
SIMPLEX ELECTRIC CO., LTD., Creda Works, Blythe Bridge, Staffs.	"California"	Portable	23½×30×6¾	1½ kW	—	Steel	Six stove enamelled colours	£10 19 0	£2 8 0
	"Capri"	Portable	22⅛×25¾×5½	1 kW	—	Steel	Six two-tone stove enamelled colours	£6 17 3	£1 10 1
	"Calypso" CH.354 and CH.355	Portable	26×12×7⅛ (750 W) 26×24⅛×7⅛ (2 kW)	750 W and 2 kW	Half-heat switch on 2 kW model	Steel	Various two-tone stove enamelled colours	£3 8 10 (CH.354) £6 18 4 (CH.355)	£0 15 1 (CH.354) £1 10 4 (CH.355)
UNITY HEATING, LTD., Chilworth Manor, Southampton.	"Conp" 1911 and 1921	Portable	24×27×5	1 kW	Thermostatic (1911) Unswitched (1921)	Steel	Bronze or grey	£12 5 0 (1911) £11 0 0 (1921)	£2 13 11 (1911) £2 8 5 (1921)
	"Conp" 1912 and 1922	Portable	24×27×5	2 kW	Thermostatic and 2-heat switch (1912) 2-heat switch (1922)	Steel	Bronze or grey	£13 0 0 (1912) £11 15 0 (1922)	£2 17 3 (1912) £2 11 8 (1922)
	"Conp" 1913 and 1923	Portable	28×30×5	3 kW	Thermostatic and 2-heat switch (1913) 2-heat switch (1923)	Steel	Bronze or grey	£14 5 0 (1913) £13 0 0 (1923)	£3 2 9 (1913) £2 17 3 (1923)
	"Wode" 1933	Portable	23×29×6	1½ kW	Thermostatic	Wood	Mahogany and light oak	£15 0 0	£3 6 0
	1951, 1952 and 1953	Inset wall panel	23⅜×24½ (panel) 20⅜×19⅞×5 (recess)	1, 2 & 3 kW	Separate thermostat	Steel	Bronze or grey	£14 10 0 (1 kW) £15 5 0 (2 kW) £16 10 0 (3 kW)	£3 3 10 (1 kW) £3 7 1 (2 kW) £3 12 7 (3 kW)

Manufacturer	Name or Model	Type	Size (H.W. & D.) in inches	Element Loading	Method of Control	Casing	Finish	Price (excl. tax)	Purchase Tax
UNITY HEATING, LTD., Chilworth Manor, Southampton. *(continued)*	1812, 1813, 1823, 1824 and 1836	Wall mounting panels	12×24×1½ to 30×66×1½	100 W to 1 kW	Separate thermostat	Steel	French grey	£7 10 0 to £26 0 0	£1 13 0 to £5 14 5
	1863 to 1866 and 1893 to 1896	Skirting board panels	6×36×1½ to 6×72×1½ and 9×36×1½ to 9×72×1½	60 W per foot run	Separate thermostat	Steel	French grey	£6 15 0 to £11 5 0	£2 9 8 to £4 9 6
WARMEX, LTD., 375, Milton Road, Cambridge.	"Warmex" WCT	Portable, wall or panel	39×26½×½	1 kW	Thermostats available as an extra	Pressed steel	Hammered bronze or colours	£7 3 0	£1 7 0
WELMEC CORPORATION, LTD., 147, Strand, London, W.C.2.	AEG "Airotherm"	Portable	21×24×7½	2 kW	Step switches	Vitreous enamelled steel, plastic handles	Brown, green or cream	£9 9 6	£2 1 6
	AEG "Climatherm" fan heater	Portable	21×24×7½	2 kW	Step switches	Sheet steel	Light green, brass feet and grille	£14 12 9	£3 4 3

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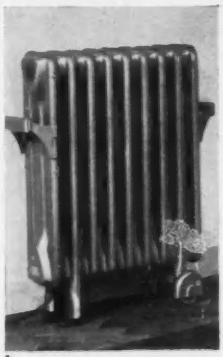

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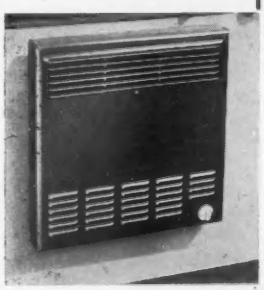
36. *Revo model F.14984 convector*
37. *Santon fluid-filled radiator*
38. *Simplex "Creda Calypso" 2 kW convector*
39. *Siemens Edison Swan 1 kW "Wafer" convector*
40. *Unity Heating skirting heater*
41. *Remploy "Chill-chaser" oil-filled radiator*
42. *Warmex model WCT wall mounting radiator*
43. *Simplex "Creda California" heater*
44. *A.E.G. "Climatherm" fan heater (Welmec Corporation)*



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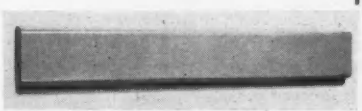

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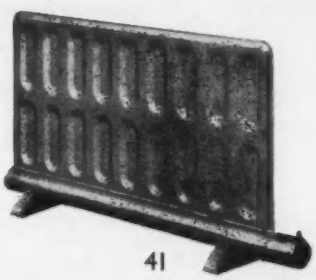

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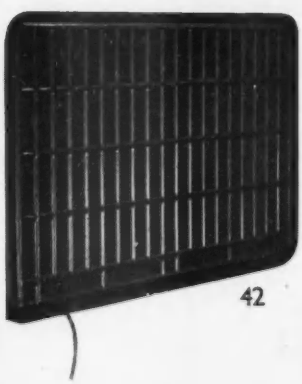

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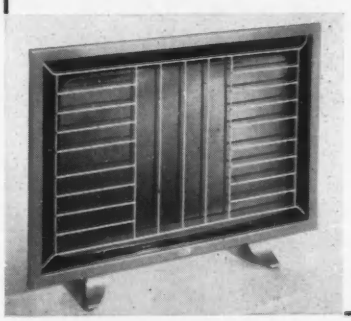

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Financial Section

STOCKS and SHARES

IN most sections of the Stock Exchange the Chancellor's important decisions, taken a fortnight ago, on the relaxation of the restrictions on bank advances and capital issues, have helped to sustain the level of prices in the face of the latest news from the Middle East. In the markets for gilt-edged stocks and for high-grade company loans and debentures the response has been particularly noticeable. A continuance of the downward trend in long-term borrowing rates is thought to be a likely prospect now that official policies are turning towards the encouragement of industrial re-expansion. For the industrial markets, the ending of the credit squeeze has of course been a helpful factor, but reactions have been restrained by uncertainty over the outlook for business and profits over the second half of this year, and much of the recent firmness of share prices has been ascribed to the influence of the rise in Government securities.

Dividends Declared

James Scott & Co. 5s shares have risen well, to about 15s 3d, since the announcement of an increase in the total dividend for 1957–58 from 20 to 22 per cent, on which basis they show a yield of 7½ per cent. The 2s shares of Marryat & Scott have failed to respond similarly to this company's decision to make a 2½ per cent increase in the dividend, to 37½ per cent: the payment is covered four times over by increased earnings, and brings the yield on the shares, at 13s 6d, to 5½ per cent. Dubilier Condenser's dividend of 20 per cent is effectively the same as last year's, allowing for the intervening scrip issue. Profits in 1957–58 were below the previous level, and the 1s shares reacted to 3s 9d. Berry's Electric Magicoal have been quoted lower, at 6s 3d, following the report of reduced earnings, although in this case also the dividend is being held at 10 per cent.

Birmingham Sound Reproducers

Introduced to the market a little over a year ago, the 5s ordinary shares of Birmingham Sound Reproducers, makers of the "Monarch" record changers and other gramophone equipment, have been a spectacular success for those who acquired them in the early stages; for dealings began then at prices in the neighbourhood of 10s, and the quotation has recently been equivalent to over 40s. They are now quoted at 26s 9d, ex a 60 per cent scrip issue.

Results for 1957 produced figures far in excess of earlier estimates, the net group profit being £1·35 million (before tax), whereas the prospectus had envisaged a surplus of not less than £350,000. In contrast with the 20 per cent dividend anticipated at that time, the total for 1957–58 was, in the event, brought up to 45 per cent, which still represented a very cautious distribution of the surplus available. It is equivalent to about 28 per cent on the present capital, and

Price Changes in

Company or Board	Nom. Value	Middle price 14th July	Week's Rise or Fall	Dividend Previous	Dividend Last	Yield %	1958 Highest	1958 Lowest
Gilt-edged Stocks						£ s d		
Brit. Elec. 1968/73	100	75½	−½	3	3	3 19 0	76	72
Brit. Elec. 1974/77	100	73		3	3	4 1 9	73½	68½
Brit. Elec. 1976/79	100	77	+½	3½	3½	4 10 3	77½	72
Brit. Elec. 1974/79	100	87		4½	4½	4 17 9	87	82½
Overseas Electric Supply								
Calcutta Elec.	£1	16/-	−6d	6†	6·8†	8 10 0†	16/9	15/-
East African Power	£1	18/6		7	7½	8 2 3	19/-	17/6
Nigerian Elec.	£1	15/-		10	10	13 6 9	17/-	14/9
Perak Hydro-Elec.	£1	14/-		10	12½	17 17 0	15/6	14/-
Electrical Shares								
Aberdare Holdings	5/-	12/-		17½	17½	7 5 9	12/-	9/9
Aerialite	1/-	7/-		48	51½	7 7 3	7/-	5/1
Allen, W. H.	£1	37/-		10	11	5 19 0	37/-	32/9
Anglo-Portuguese Tel.	£1	24/9		8	9	7 5 6	27/3	19/9
Aron Elec. Ord.	£1	55/-		15	15	5 9 0	57/6	53/-
Assoc. Elec. Ord.	£1	50/-		15	15	6 0 0	51/3	46/6
Automatic Tel. & El.	£1	65/-		17	17	5 4 6	66/3	57/-
Babcock & Wilcox	£1	47/9		15	13‡	5 8 9	52/9	41/9
Bakelite	10/-	19/3		15	15	7 15 9	21/-	17/6
Baldwin, H. J.	2/-	2/6		20	20	16 0 0	3/9	2/6
Berry's Electric	5/-	6/3	−9d	10	10	8 0 0	7/6	5/9
British Aluminium	£1	45/-	+9d	12	12	5 6 9	47/-	37/-
Brit. Elec. Traction: Def. Ord. "A"	5/-	24/6x.d.	+1/6	25	25	5 2 0	24/6	19/6
B.I. Callender's	£1	43/-		12½	12½	5 16 3	45/6	38/9
B.I. Callender's 6% Pref.	£1	19/-		6	6	6 6 3	20/3	19/-
British Tabulating	£1	50/-		9	10	4 0 0	51/3	38/6
British Thermostat	5/-	30/-		25	30	5 0 0	30/-	19/9
British Vac. Cleaner	5/-	4/9		10	10	10 10 6	5/3	4/6
Brook Motors	10/-	37/6		25	25	6 13 3	37/6	33/3
Bulgin, A. F.	1/-	5/3		40	45	8 11 6	5/6	4/7
Bulpitts	5/-	7/6		—	12½‡	8 6 9	7/6	7/6
Burco Dean	5/-	8/6	+3d	20	22½	8 16 6*	9/6	7/9
Cable & Wireless: Ord	5/-	10/6		10	10‡*	4 15 3	10/6	8/-
4% Loan	100	93½		4	4	4 5 6	94½	89
Chloride El. Storage "A"	£1	57/6	+9d	17½	17½	6 1 9	62/-	55/6
Clarke Chapman	£1	122/6		27½	27½	4 9 9	7½	5½
Cole, E. K.	5/-	15/6x.d.	−3d	17½	17½	5 13 0	18/-	15/6
Cossor, A. C.	5/-	4/6		Nil	2½	2 15 6	5/6	4/4
Crabtree	10/-	28/-		20	20	7 2 9	28/-	24/4
Crompton Parkinson Ord.	5/-	10/3		16	16	5 4 0*	10/6	8/3
De La Rue	10/-	23/9x.d.	+6d	35	17½*	7 7 3	26/3	20/9
Decca "A"	4/-	25/9	+9d	43½	43½	6 16 0	27/6	21/3
Desoutter	5/-	16/6	+1/-	32½	18½*	5 13 9	16/6	13/6
Dewhurst	2/-	7/6x.d.	−6d	16½	20	5 6 9	8/-	6/9
Dictograph Tel.	2/-	6/3		20	20*	6 8 0	6/3	4/7
Dubilier Condenser	1/-	3/9	−6d	30	20*	5 6 9	4/3	3/1
Duport	5/-	8/3	+3d	25	25	7 11 6*	9/4	7/9
E.M.I.	10/-	36/-	+3d	15	15	4 3 3	36/9	27/6
Electrical Components	5/-	7/6		25	12½*	8 6 9	8/-	7/-
Elec. Construction	£1	23/9		8½	8½	7 3 3	25/-	21/-
Elliott-Automation	5/-	14/6		—	10‡	3 9 0	14/6	11/6
Enfield Cable Ord.	£1	14/-		Nil	2½	3 11 3	17/-	10/9
English Electric	£1	53/3	+9d	14	14	5 5 3	56/3	44/-
English Electric 3½% Pref.	£1	12/-		3½	3½	6 5 0	12/3	11/9
Ericsson Tel.	5/-	20/3		22†	12*†	2 19 3†	21/-	17/6
Ever Ready	5/-	18/-	−9d	37½	20*	5 11 0	19/3	13/9
Falk Stadelmann	£1	38/9		17½	17½	9 0 9	38/9	35/-

The above quotations are based upon middle prices in the Stock Exchange Daily Official List.
* After scrip issue. † Free of income tax. ‡ Dividend indicated.

on this rate the shares show a yield of 5¼ per cent.

Company News

There has been strong support for the £1 shares of the British Tabulating Machine Co., up to 50s, since the preliminary announcement of agreement in principle to a merger with Powers-Samas Accounting Machines, who are controlled by Vickers. Full details are not expected for some time to come.

Electrical Investments

Company or Board	Nom. Value	Middle price 14th July	Week's Rise or Fall	Dividend Previous	Dividend Last	Yield % £ s d	1958 Highest	1958 Lowest
Electrical Shares—continued								
G.E.C. Ord.	£1	32/6		14	12½	7 14 0	38/9	29/3
G.E.C. 6½% Pref.	£1	20/3		6½	6½	6 8 6	21/3	20/3
General Cables	5/-	10/3		30	24	—	11/9	10/3
Greenwood & Batley	£1	48/3x.d.		17½	20	8 5 9	48/3	45/-
Hackbridge Holdings	5/-	13/3	−1/-	30	20	7 11 0	14/3	7/6
Hackbridge & Hewittic	5/-	11/6		20	20	8 14 0	12/-	9/7
Head Wrightson	5/-	21/3	−6d	22½	17½*	4 2 3	22/3	16/9
Heatrae	2/-	6/x.d.		15	20	6 13 3	6/-	4/-
Henley's	10/-	11/6	+9d	11½	11½	10 0 0	14/6	10/6
Holophane	5/-	13/6		30	37½	8 6 9*	13/9	12/6
Hoover	5/-	42/6	+6d	50	50	5 17 9	43/-	31/-
I.C.I.	£1	28/-	−1/-	10	12	5 14 3*	30/3	23/9
Intl. Combustion	5/-	26/6		22½	25	4 14 3	26/6	19/3
Johnson & Phillips	£1	17/6		10	5	5 14 3	25/-	15/-
Lancashire Dynamo	£1	40/-		11	11	5 10 0	40/-	28/6
Laurence Scott	5/-	14/9		15	15	5 1 9	14/9	12/6
Lister, R. A.	£1	24/6		10	10	8 3 3	26/3	23/-
London Elec. Wire	£1	45/-		12½	12½	5 11 0	45/-	39/6
Lucas, J.	£1	37/6	+1/-	7½	7½	4 0 0	37/6	27/9
Marconi Marine	£1	32/6		10	10	6 3 0	32/6	29/-
Marryat & Scott	2/-	13/6	−3d	35	37½	5 11 0	14/-	10/3
Mather & Platt	£1	39/6	−6d	15	15	5 1 3*	40/-	29/6
Metal Industries	£1	33/6		9	14	8 7 3	32/6	22/9
Midland Elec. Mfg.	£1	46/3		12½	12½	5 8 0	48/3	44/-
Morphy-Richards	4/-	16/-		50	20*	5 0 0	16/9	14/6
Murex	£1	55/6		20	20	7 4 3	58/3	53/3
Newman Ind.	2/-	2/3		10	10	8 17 9	2/9	2/3
Oldham & Son	1/-	2/6		17½	17½	7 0 0	2/7	2/3
Parnall (Yate)	5/-	15/-		12	12	4 0 0	15/-	5/9
Parsons, C. A.	£1	46/6		8¼	7½*	3 4 6	53/6	43/-
Plessey	10/-	57/6	−6d	30	30	5 4 3	60/6	55/-
Pye "A" Deferred	5/-	11/9		12½	12½	5 6 6	13/9	10/-
Reyrolle	£1	76/3		17½	17½	4 11 9	84/6	73/6
Rheostatic	4/-	6/-		12½	12½	8 6 9	8/-	6/-
Richardsons Westgarth	10/-	13/6		16¾	8¼*	6 3 6	15/-	13/-
Scottish Cables	4/-	15/3	+6d	27½	27½	7 4 3	15/3	12/3
Simon-Carves	5/-	26/9	+6d	20	25	4 13 6	27/9	22/6
Smith (England), S.	4/-	9/3	+6d	17½	20	4 6 6*	9/3	7/-
Southern Areas	£1	10/3	+1/-	7½	Nil	Nil	13/9	9/3
Strand Elec.	5/-	5/3	+6d	15	15	14 5 6	6/3	4/9
Sturtevant	5/-	15/3		15†	15†	4 18 3†	18/-	14/9
Sun Elec.	£1	47/6		25	25	10 10 6	47/6	47/3
Switchgear & Cowans	5/-	11/9	+3d	25	22½	9 11 6	11/9	8/9
Taylor Tunnicliff	5/-	13/3		15	17½	6 12 0	13/9	11/9
T.C.C.	10/-	35/-		25	25	7 2 9	38/6	35/-
T.C. & M.	£1	24/-		8¼	8¼‡	7 1 9	27/-	20/-
Telephone Mfg.	5/-	4/9	+3d	10	10	10 10 6	5/3	4/6
Telephone Rentals	5/-	11/6	+3d	12½	12½	5 8 9	11/6	9/9
Thompson (John)	5/-	24/-		25	25	5 4 3	27/-	23/-
Thorn Elec. "A"	5/-	20/9	−2/6	15	17½	4 4 3	23/3	17/-
Thornycroft	£1	21/3	−3/9	12½	12½	11 15 3	27/9	21/-
Tube Investments	£1	55/6		13¾	15	5 8 0	55/6	48/3
Vactric	5/-	15/-		25	25	8 6 9	15/6	14/3
Veritys	5/-	5/3		12½	2½	2 7 6	6/9	5/3
Walsall Conduits	4/-	14/3		20	22½	6 6 3	14/3	11/-
Ward & Goldstone	5/-	29/-	+6d	35	40	3 9 0*	29/-	23/6
Watford	2/-	6/6		25	25	6 3 0*	7/6	5/-
Westinghouse	£1	38/6		18	10*	5 4 0	40/-	32/3
West, Allen	5/-	11/6	+3d	15	12½*	5 8 9	12/-	9/3
Wolf Electric	5/-	7/3		20	10*	6 18 0	9/-	6/9

Metal Industries £1 shares have also been very firm, at 33s 6d, in response to the annual report, which confirms the expansion of group profits in 1957–58 to a record figure of £1¾ million, and includes a satisfactory review of prospects by Sir Charles Westlake. The dividend of 14 per cent represents the same total as last year when, however, 5 per cent of the payment was in the form of a special bonus. Clarke Chapman £1 shares have been well maintained since the company's proposals for a £1½ million debenture stock issue and a 100 per cent ordinary scrip issue. A scrip issue is also proposed by Scottish Cables, whose 4s shares improved to 15s 3d.

British Relay

British Relay Wireless and Television, in which Pye and Murphy Radio are substantially interested, have recently raised fresh capital by issues of loan stock and 900,000 ordinary shares. The latter were offered to stockholders at 12s each. Good progress has been made by this company since the shares were first marketed five years ago, and the new issues resulted from measures taken to secure the finance needed for the continued development of the radio and television relay services operated in London and the provinces. According to a statement at the time of the issues, profits for the year ended last April are expected to show little change on the figures of the previous year, when a net surplus of nearly £200,000 was earned, and dividends totalling 20 per cent were paid. Given the same rate on capital increased by the new issue, there is a prospective yield of nearly 5½ per cent on the 5s shares at 18s 6d. The new shares, which will not qualify for the final dividend due to be declared this month, stand a few pence lower.

Convertible Loan Stock

Circumstances do little to affect the popularity of stocks bearing a fixed rate of interest in combination with an option to convert holdings at a later stage into the ordinary shares of the company concerned. Among electrical issues of this description is the Electric Construction Co.'s 5¾ per cent convertible loan stock, which comes on offer occasionally at a price of around 100. Holders have the right to convert each £50 stock into 36 of the company's £1 ordinary shares in September of each of the three years 1958–60. Through this provision a buyer of the loan stock at par secures, in effect, an option on the ordinary shares at about 27s 9d, which is 4s above their present market quotation.

Power Securities

The £1 ordinary shares of Power Securities have been quoted at about 45s since the annual meeting. For 1957 the company has paid a second successive dividend of 11 per cent, on which basis the yield works out at 4·9 per cent.

REPORTS and DIVIDENDS

Metal Industries, Ltd.—In his statement which has been issued with the report and accounts for the year to 31st March last, Sir Charles Westlake (chairman) says that the year was a record one in the history of the company. In June the board decided that it was in the best interests of the group to dispose of its holding of £1·5 million ordinary stock in the British Oxygen Co., Ltd. This was offered to Metal Industries' ordinary stockholders at the price of 30s per £1 unit of stock. This operation has brought in about £2,149,000.

Turning to the activities of the constituent companies, Sir Charles refers to the merger of Fawcett Preston & Co., Ltd., and Finney Presses, Ltd., now known as Fawcett Preston & Co., Ltd. (incorporating Finney Presses), and says that Fawcetts had a fairly satisfactory year, continuing to fill many orders for plastic and rubber extrusion machinery, hydraulic presses and electrical resistors.

In the electrical division, the Igranic Electric Co., Ltd., achieved both a record output and a record trading profit. With an eye to the expansion of markets and on competition from abroad, plans are well advanced for the establishment of a European organisation. Brookhirst Switchgear, Ltd., showed a greatly improved profit over the previous year. There has, however, been a drop in orders because of the effect of the credit squeeze in slowing down the demand for capital goods. The company has carried out extensive re-designs of equipment and the "Chester Major" and "Junior" control boards, in particular, have been well received.

To enable the group to play an increasing part in the rapid developments which are taking place in the electrical field, they have decided to bring the two electrical control gear subsidiaries under one management. The new organisation, to be known as Brookhirst Igranic, will be the largest manufacturer of electrical control gear in the United Kingdom; they have secured the services of Mr. H. Owen Houchen, formerly of British Overseas Airways Corporation, as its chief executive.

Berry's Electric Magicoal, Ltd.—The main figures in the accounts for the year ended 31st March last were given in our last issue.

In his statement which accompanies the report and accounts, Mr. R. Berry (chairman and managing director) says that the credit squeeze, together with an unusually mild winter, reduced the demand for electric fires and heaters. As a result, their sales for the year suffered a decline whilst in general the operating costs in relation to turnover increased. The authorised capital was increased during last year by the creation of 240,000 additional ordinary shares. Shareholders were informed that this increase was required to satisfy in part a proposed purchase of another concern, but negotiations were finally broken off as certain factors arose which led the board to believe it might not be in the best interests of the company to continue. Although at the present time they have no other transactions under consideration calling for the issue of these shares, the board is mindful of the desirability of widening the scope of the company's business, in which case it might be possible to utilise them.

Export sales have been well maintained and in one particular market, the United States, considerably increased. Magicoal fires are now exported to 95 different countries and progress is only frustrated by local import restrictions. Since the beginning of the new financial year there has been a marked improvement in sales. The purchase tax reduction, Clean Air Act, and the easement of the credit squeeze will have a stimulating effect upon the development and sale of their products. Furthermore, they are introducing new designs and extending their range of products so that in their own sphere they will continue to lead the field.

Reliance-Clifton Cables & Industrial Products, Ltd.—In his review of 1957, Sir Robert Renwick, Bt. (chairman), says that in his statement last year he warned that the unfavourable trading conditions which were affecting all sections of the cable-making industry made it unlikely that they could match the exceptional results of recent years. From the record level of 1956, both trading and net profits have fallen back to amounts which are almost identical with those attained in 1955. To provide for future expansion, they purchased some five years ago a large leasehold factory almost adjoining their present premises, with a sitting tenant in possession until 1961. They have other plans for this factory when it becomes available and to provide for the immediate future it was decided to acquire manufacturing space elsewhere. Arrangements were made last August with the Northern Ireland Government to build a factory to their requirements and this will be ready for occupation within about two months. It is situated on the outskirts of Belfast. The initial demand on their resources will be moderate as the buildings are being leased and a concession rental applies for the first few years. A company, Belfast Cables, Ltd., has been formed.

The adverse trading conditions referred to last year continued throughout 1957 and became more acute. Sir Robert refers to the fluctuations in the price of copper, but says that as the copper content of the telecommunications and other light current cables in which they specialise is not large, they escaped the considerable losses suffered in many sections of the industry, but with selling prices drifting downwards with the price of copper, it was impossible to recover increases in wages and general operating costs. The effects of credit restriction became more acute, particularly the direct measures which were taken to restrict expenditure by the nationalised industries and, what most concerned them, to curtail the Post Office telephone programme. There has been no improvement in the situation in the present year. It may well be that a very considerable increase in demand, sustained over a lengthy period, will be required to absorb present productive capacity and to refill order books before supply and demand are again reasonably equated and stable and reasonably remunerative price levels are restored.

Simms Motor & Electronics Corporation, Ltd.—Referring to the acquisition last October of the whole of the ordinary stock of the Motor & Electronics Corporation, Ltd., the chairman, Mr. G. E. Liardet, says that the addition of the M.E.C. group implements their policy of diversification and expansion. Their products now include many types of electronic components, and accessories for radio, television, radar and telecommunications, etc. Having referred to the various operating companies individually, the chairman says that efforts are being made to strengthen still further their Research and Development Departments and to improve their production techniques.

During the year the group's export business has expanded, though rising costs are increasing their difficulties in competing in many export markets and their only hope is stability of wages and increased productivity. As a long-term measure they are looking for clarification of the European Free Trade Area scheme, as they are determined to take every opportunity of selling their products in Europe. Meeting, 25th July.

Ada (Halifax), Ltd.—At last week's annual general meeting Lt.-Col. W. D. Gibbs (chairman) said that turnover had improved during the year although the trading profit had fallen from £193,437 to £180,871. The board regarded the results as eminently satisfactory in view of the increased costs and the "credit squeeze." Since the close of the year there had been a notable rise in demand for the company's products. Referring to their new washer and spin dryer introduced at the end of March, he reported that inquiries and orders had far exceeded expectations.

Worcester Royal Porcelain Co., Ltd.—The chairman, Mr. J. F. Gimson, in his review to be presented at the annual general meeting on 28th July, says that the company's largest subsidiary, Welwyn Electrical Laboratories, Ltd., had budgeted for a substantial increase in sales in 1957 and in the early part of the year, with

the revival of the radio and television industry, there seemed every prospect that this increase would be achieved. Unfortunately, the change in the Government's fiscal and defence policies had materially affected the intake of orders while unforeseen technical problems had prevented the introduction of new products. As soon as these adverse factors became apparent drastic action was taken and the Stockton-on-Tees factory was closed, production being concentrated at the Bedlington factory. As a result of this move, and improved methods of manufacture, it is hoped that the results in the current year will be more satisfactory.

The Electric Construction Co., Ltd.—The report and accounts now issued show a consolidated surplus on manufacturing and trading of £346,181 for the year ended 31st March last, as compared with £308,407 for the previous year, and after deducting all charges, including £120,490 for taxation, the group net profit is £109,014 (against £102,571), of which £106,934 is attributable to the holding company. General reserve receives £50,000, and as we have already reported, the ordinary dividend for the year is maintained at 8½ per cent. The balance carried forward is £80,618 (against £72,900 brought in).

In his accompanying statement, Mr. C. Reid (chairman) says that notwithstanding curtailment of purchasing early in the financial year, brought about by the increased bank rate, production was again at a record level. A new company, E.C.C. (Moulded Breakers), Ltd., has been formed, and a factory of 40,000 sq ft is in course of erection at Wolverhampton. E.C.C. South Africa (Pty.), Ltd., has made a satisfactory profit and has a full order book. E.C.C., Ltd., has been formed at Wellington, New Zealand, in which they have a joint interest; manufacture will commence during the current year. Tyseley Foundry, Ltd., has had a successful year although profits are somewhat lower.

The Telephone Manufacturing Co., Ltd.—The annual meeting was held on Monday last, Mr. F. T. Jackson (chairman and managing director) presiding. In his statement, which had been previously circulated, the chairman said that whilst the rate of output achieved in 1956 was maintained in 1957, there was a reduction in the volume of deliveries of subscribers' apparatus to the British Post Office. However, this was offset by increased deliveries in other directions, in particular of line transmission equipment and of subscribers' apparatus for overseas customers. But in the latter case price levels were not profitable. The percentage of exports increased from 19 per cent in 1956 to 26 per cent in 1957. Mr. Jackson referred to the adverse effect on their order book of the curtailment of the activities of the British Post Office and said that orders placed in 1957 for subscribers' apparatus were negligible nor would there be any improvement in the current year. It seemed likely, therefore, that trading conditions of the company would remain poor until, perhaps, the latter part of 1959. The directors were concentrating on development work to enable them to expand the business, but this was a rather long-term policy which could not be expected to produce immediate results.

Vent-Axia, Ltd.—In his circulated statement covering the year ended 31st March last, Mr. J. C. Akester (chairman and managing director) says that the improved results have been obtained from increased sales both in Vent-Axia, Ltd., and the subsidiary, Axia Fans, Ltd. The value of orders received during the last six months by Axia Fans, Ltd., whose business is based mainly on the shipping industry, is a little up on the corresponding period of the previous year but a fall during the next half of the year is possible as fewer new ships are being placed. The work in hand due to be completed during the current year should, however, be sufficient to produce profits if not as high as last year, at least satisfactory. A site has been taken from the Crawley Development Corporation where the administrative, technical and manufacturing activities for both companies will be concentrated. A new factory for Axia Fans, Ltd., will be occupied this month. In addition they have entered into a 21 years' lease on the whole of a new building in Rochester Row, S.W.1, which should be ready for occupation by the end of September this year.

Veritys, Ltd.—A trading loss of £29,422 is recorded for 1957, as compared with a profit of £62,124 for 1956. This loss is after transferring £10,000 from stock contingencies reserve to cover losses on certain stocks. After taxation of £1,215 and crediting £20,000 tax recoverable, a net loss of £20,866 is shown (against a profit of £21,756). It is proposed to pay a dividend for the year of 2½ per cent (against 12½ per cent) and, after taking £10,271 from general reserve, a balance of £20,158 is carried forward (against £33,340 brought in).

The Dubilier Condenser Co. (1925), Ltd., reports a trading profit for the year to 31st March last of £315,057, as compared with £392,536 for the preceding year. The net profit is £114,077 (against £157,538), after deducting taxation of £133,341. It is proposed to pay a dividend for the year of 20 per cent on capital increased by a one-for-two scrip issue (against 30 per cent on the former capital). General reserve receives £75,000 and £119,983 is carried forward (against £123,832 brought in).

Scottish Cables, Ltd.—The consent of the Treasury has been obtained to the capitalisation of £416,667 of revenue reserves, and it is proposed to issue 2,083,335 4s ordinary shares in the proportion of five for every seven 4s units held.

Aiton & Co., Ltd., report a group trading profit of £497,357 for the year to 31st March last, as compared with £537,300 for the preceding year, and after meeting all charges, including £218,555 for taxation, the net profit is £196,659 (against £236,212). General reserve receives £160,000 and it is proposed to pay a final dividend of 7½ per cent, making 10 per cent for the year on trebled capital. The total distribution for the previous year on the former capital was 25 per cent. The balance carried forward is £51,217 (against £56,876 brought in).

Britannia Electric Lamp Works, Ltd., reports that after deducting £36,275 for taxation, the group net profit for the year to 31st March last is £34,495, as compared with £58,604 for the previous year. The dividend for the year is maintained at 12½ per cent.

New Companies

Daystrom, Ltd.—Registered 12th June. Capital £250,000. To design, develop, manufacture, produce, trade and deal in electrical, electronic, nuclear and industrial devices, appliances, kits, apparatus and equipment of all kinds, manufacturers of and dealers in plant and machinery, furniture and office and factory equipment, etc. Solicitors: Kenneth Brown, Baker, Baker, Essex House, Essex Street, W.C.2.

Wandleside Warrenware Co., Ltd.—Registered in Belfast 21st May. Capital £500,000. Manufacturers and processors of material for insulating wire and other purposes, wire drawing, wire insulation, etc. Regd. office: 16, High Street, Belfast.

Rogers of Walton, Ltd.—Registered 11th June. Capital £100. Electricians, electrical engineers, radio, radar, wireless and television engineers, etc. Directors: N. C. Rogers and Winifred Rogers. Regd. office: 46, Esher Road, Walton-on-Thames, Surrey.

All-Vacs, Ltd.—Registered 11th June. Capital £3,000. Manufacturers of and dealers in electrical, electronic and lighting fittings, electrical engineers, etc. Directors: J. J. Caffari and E. R. Curwen. Regd. office: 107/9, Churchfield Road, W.3.

W. E. Kidd, Ltd.—Registered 5th May. Capital £500. Electricians, electrical engineers, etc. Directors: W. E. Kidd, Mrs. Maggie Kidd and R. B. Kidd. Regd. office: 31, Bold Street, Warrington.

Bankruptcies

J. Darwen, formerly carrying on business at Dane Bank House Works, Windmill Lane, Denton, Lancs., previously carrying on business at 23, Reddish Lane, Gorton, Manchester, as an electrical contractor.—Receiving order made 2nd July on debtor's own petition.

W. V. Tupling, electrician, carrying on business at 27, Church Street, Warsop, Notts. —Trustee, Mr. R. F. Bendall, 126, Colmore Row, Birmingham, released 23rd June.

K. Hanson, trading as Hanson's Electronics, at 2, Hall Street, and 1, Parker Lane, Burnley, Lancs., electrical engineer.—First and final dividend of 3s 3½d in the £, payable at the office of Mr. L. H. Shipton, 31, Lloyd Street, Manchester, 2.

B. Landau, 60, Myrdle Street, Commercial Road, E.1, electrical engineer, lately carrying on business at 401, Commercial Road, E.1, and formerly carrying on business at 31, Cannon Street Road, E.1, both in the name of Landau Electrical Co., as a retailer of electrical goods and as electrical contractors.—First meeting 22nd July and public examination 23rd September, both at Bankruptcy Buildings, Carey Street, London, W.C.2.

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (3s 6d each including postage) are obtainable from the Patent Office, 25, Southampton Buildings, London, W.C.2

1953

30215. Pye, Ltd.—Four-terminal networks and signal distribution systems incorporating such networks. 6th October, 1954. (798255.)

33886. Electric & Musical Industries, Ltd. —Generation of synchronising pulses, especially for television. 25th November, 1954. (Cognate applications 8823, 26th March, 1954, and 33427, 18th November, 1954.) (798083.)

1954

1079. Electric & Musical Industries, Ltd. —Range detecting radio pulse transmitting and receiving systems. 4th January, 1955. (798060.)

8822. Electric & Musical Industries, Ltd. —Frequency dividing circuits. 28th March, 1955. (798084.)

17803. British Oxygen Co., Ltd.—Electric arc welding. 16th June, 1955. (798292.)

29757. English Electric Co., Ltd.—Electrical measuring instruments. 14th October, 1955. (798181.)

31074. Radio Corporation of America.— Electrophotographic printing. 27th October, 1954. (798184.)

31409. Ferranti, Ltd.—Transformer tap-change systems. 27th January, 1956. (798185.)

32959. Telefunken Ges. für Drahtlose Telegraphie.—Electron discharge devices of the hard type and electrostatic lenses therefor. 15th November, 1954. (798257.)

33610. General Electric Co.—Semi-conductor devices. 19th November, 1954. (798213.)

1955

3127. British Broadcasting Corporation. —Control means for colour television. 23rd January, 1956. (798301.)

7232. Standard Telephones & Cables, Ltd.—Arrangement for relieving electrode connections with respect to high-tension. 11th March, 1955. (798215.)

9804. Mullard Radio Valve Co., Ltd.— Electric trigger circuits, oscillator circuits and like employing transistors. 17th February, 1956. (Cognate application 23113, 10th August, 1955.) (798188.)

10656. British Thomson-Houston Co., Ltd.—Mercury arc rectifiers. 13th April, 1956. (798122.)

12391. Whipp & Bourne, Ltd., and Whipp, F. E.—Automatic electric switches or circuit-breakers. 27th April, 1956. (798033.)

17979. Robertshaw-Fulton Controls Co.— Capacity sensitive relay mechanism for controlling the level of flowable material in a container. 21st June, 1955. (798241.)

20401. Baldwin, W. E.—Insulated electrical heating elements. 16th July, 1956. (798304.)

23069. Siemens & Halske Akt.-Ges.— Electron tubes of the travelling-wave tube type. 10th August, 1955. (798242.)

24336. National Research Development Corporation.—Magnetically operated electrical switching devices having conducting liquid contacts. 21st November, 1956. (798191.)

27651. British Thermostat Co., Ltd.— Flow-controlling devices. 27th September, 1956. (798170.)

31191. Telefunken Ges.—Attachment of screened electric connecting cables to electrical apparatus. 1st November, 1955. (798306.)

31297. Deutsche Telephonwerke und Kabelindustrie Akt.-Ges.—Electronic digital computer. 2nd November, 1955. (798312.)

31951. Siemens-Schuckertwerke Akt.-Ges.—P-I-N rectifiers. 8th November, 1955. (798359.)

33572. Marconi's Wireless Telegraph Co., Ltd.—Radio direction finding systems. 5th July, 1956. (798218.)

34034. General Electric Co., Ltd.—Electric lighting fittings. 19th September, 1956. (798219.)

34791. Philips Electrical Industries, Ltd. —Circuits for deriving a sum voltage and a difference voltage from two input voltages. 5th December, 1955. (798266.)

36671. Yuasa Battery Co., Ltd.—Plates for lead-acid batteries. 21st December, 1955. (798037.)

1956

996. Parsons & Co., Ltd., C. A.—Dynamo-electric machines. 3rd December, 1956. (798258.)

1186. Electric & Musical Industries, Ltd. —Methods of mounting electrical components. 14th January, 1957. (798130.)

2326. British Thomson-Houston Co., Ltd.—Angular position control systems. 24th January, 1957. (798384.)

3063. Marconi's Wireless Telegraph Co., Ltd.—Cathode-ray tube display systems. 16th October, 1956. (798361.)

4076. English Electric Co., Ltd.— Dynamo-electric machines. 6th February, 1957. (798195.)

4265. Standard Telephones & Cables, Ltd.—Channel branching arrangements in carrier communication systems. 8th February, 1957. (798245.)

4836. Lucas (Industries), Ltd., J.—Alternating electric current supply system for use on a motor-cycle or other road vehicle. 12th February, 1957. (798386.)

4938. Simplex Electric Co., Ltd.— Counterweight mechanisms for oven doors and the like. 15th February, 1957. (798040.)

5165. Gas Accumulator Co. (United Kingdom), Ltd.—Lampholders for pre-focus electric lamps. 11th December, 1956. (798041.)

5588. Mosaic Tile Co.—Electrically conductive ceramic floor-tile units and floors composed of such conductive units. 23rd February, 1956. (798043.)

6661. S.A.D.I.R. Carpentier.—Apparatus for monitoring radar systems. 2nd March, 1956. (798362.)

6852. General Electric Co., Ltd.—Electric amplifiers. 5th March, 1957. (798143.)

7446. Standard Telephones & Cables, Ltd. (Laboratoire Centrale de Telecommunications Soc. Anon.).—Latent heat cooling of thermionic valves. 9th March, 1956. (798220.)

7491. Siemens-Schuckertwerke Akt.-Ges. —Electrodes for electrochemical purposes. 9th March, 1956. (798109.)

8318. Philips Electrical Industries, Ltd.— Colour television receivers. 16th March, 1956. (798363.)

8859. Crater Products, Ltd.—Visual indicating devices for electric switches. 24th January, 1957. (798387.)

9187. Wipac Development, Ltd.—Permanent magnet electrical generators. 21st February, 1957. (798281.)

10855. Bauer Ges., E.—Apparatus for synchronising sound and vision with a motion picture projector. 10th April, 1956. (798112.)

11196. Pye, Ltd.—Four-terminal networks and signal distribution systems incorporating such networks. 6th October, 1954. (Divided out of 798255.) (798256.)

12026. United Kingdom Atomic Energy Authority.—Fuel elements for nuclear reactors. 4th April, 1957. (798282.)

12682. Aircraft-Marine Products, Inc.— Tools for crimping electrical connectors to conductors. 25th April, 1956. (798134.)

13781. Bosch Ges., R.—Self-sealing electric condensers. 4th May, 1956. (798202.)

14968. Barber-Colman Co.—Electrical control apparatus. 14th May, 1956. (798344.)

18140. Siemens & Halske Akt.-Ges.— Co-ordinate switching arrangements. 12th June, 1956. (Addition to 797913.) (798272.)

18779. Gaylord Products, Inc.—Speed-responsive electric switches. 18th June, 1956. (798348.)

22516. Bölkow, L.—Device for hindering overhearing in secret information transmission systems. 20th July, 1956. (798114.)

23169. Simon, J. C.—Low temperature electric heater. 26th July, 1956. (798206.)

24761. Cinch Manufacturing Corporation. —Holders for thermionic valves, electrical plugs or like devices having projecting terminal prongs. 13th August, 1956. (798047.)

25897. Allmänna Svenska Elektriska Aktiebolaget.—Induction heating furnaces. 24th August, 1956. (798207.)

26715. Siemens & Halske Akt.-Ges.— Cable telecommunication systems. 31st August, 1956. (798050.)

26716. Siemens-Schuckertwerke Akt.-Ges. —Regulating units for electric lighting installations. 31st August, 1956. (798368.)

28795. General Electric Co.—Method of forming finned sheathed electric heater elements. 20th September, 1956. (798051.)

29601. Telefonaktiebolaget L. M. Ericsson.—Electromagnetic relay sets. 27th September, 1956. (798208.)

29687. Western Electric Co., Inc.—Means for erasing magnetic records. 28th September, 1956. (798138.)

33094. General Electric Co.—Coupling arrangements. 30th October, 1956. (798230.)

35879. Standard Telephones & Cables, Ltd.—Negative-impedance repeater using a transistor amplifier. 23rd November, 1956. (798055.)

36051. Gilbert & Barker Manufacturing Co.—Electronic grounding apparatus. 26th November, 1956. (798149.)

1957

1591. Standard Telephones & Cables, Ltd. (Nippon Electric Co., Ltd.).—Electric frequency dividing arrangements. 16th January, 1957. (798150.)

1892. Sperry Rand Corporation.—Two-stage half-wave magnetic amplifier. 18th January, 1957. (798240.)

2286. Sperry-Rand Corporation.—Digital data storage circuit. 22nd January, 1957. (798057.)

11769. Mond Nickel Co., Ltd.—Welding electrodes. 10th April, 1957. (798153.)

Protective Filter Glasses

New aids to assist welding firms choose the correct types of protective filter glasses for their operatives have been devised by Chance Brothers, Ltd. They are cards and wallets containing samples of seven "Protex" glasses for electric welding and eight "Protal" and "Protex" glasses for gas welding with and without flux. All conform to British Standard Specifications. With them it is easy to decide which filter is the most suitable for a particular job, by trying out a selection under working conditions. The cards and wallets are available free to suppliers of welding protection equipment.

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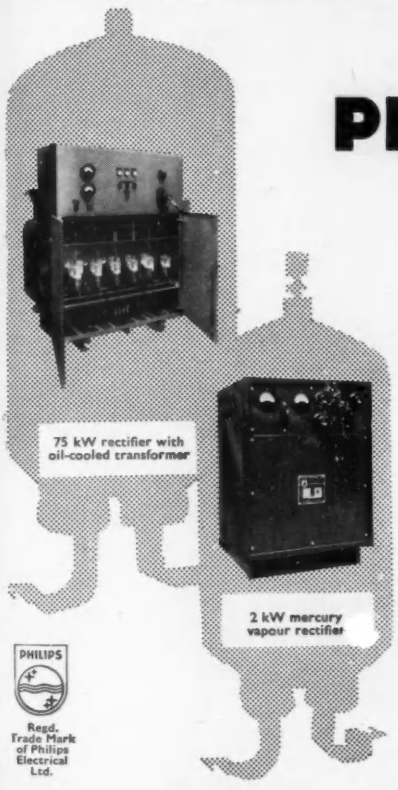
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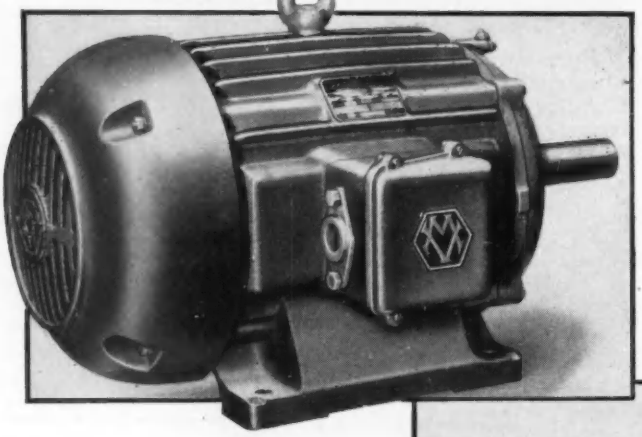
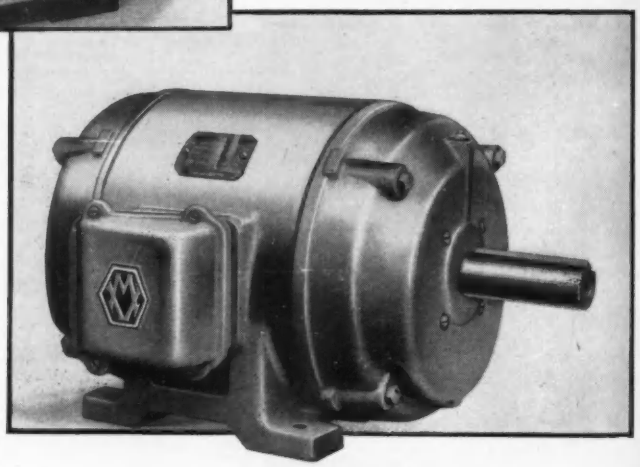
MOTORS with Standardised Dimensions



Type KN-B to BS2083/1956
TEFC ENCLOSURE
1-20 hp* (4-pole)

**Additional Ratings not included in BS2083 are also available up to 50 hp.*

With the introduction of the new BS2960/1958, squirrel-cage motors with Standardised Dimensions can now be supplied with VENTILATED as well as TEFC enclosures. Metrovick Motors designed and built to these specifications are known as Types KN-C and KN-B respectively.



Type KN-C to BS2960/1958
VENTILATED Enclosure from
1 to 40 hp (4-pole)

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GENERATION AND DEVELOPMENT

New Harlow Substation

Harlow West substation, which Sir Richard Costain, chairman of the New Town Development Corporation, commissioned last week, is now the main source of electricity supply to the town centre and to the Pinnacles industrial estate of the new town. It is the second of three major substations, the first having been erected and commissioned in 1953; the third, to be known as Harlow South, will be undertaken in a few years' time. The double circuit grid type construction for the overhead line from Rye House was influenced by the fact that the total load to be dealt with would eventually be about 40 MW and the line could readily be uprated for operation at 132 kV if it was decided to make Harlow West a bulk supply point in the future. The cost of the substation with the transmission line from the generating station was approximately £177,000.

Construction of Bradwell Reactor

The bottom two courses of the spherical pressure vessel for No. 1 reactor at the Bradwell nuclear power station were recently lifted into position as a single unit by the goliath crane. The unit is approximately 53ft in diameter at its widest point and weighs 215 tons.

The pressure vessels, which will be 66ft 9in in diameter, are the responsibility of Whessoe, Ltd., one of the eight members of the Nuclear Power Plant Co., Ltd., which is building the 300 MW Bradwell power station for the Central Electricity Generating Board. They are fabricated from steel plates varying in thickness from 3 to 4in. The size and thickness of these plates takes this operation out of the normal capacity of presses in this country. Whessoe, Ltd., have therefore had a new press installed specially at their works at Darlington for this type of work. It has a capacity of 4,500 tons and is capable of handling plates 25ft long by 10ft wide.

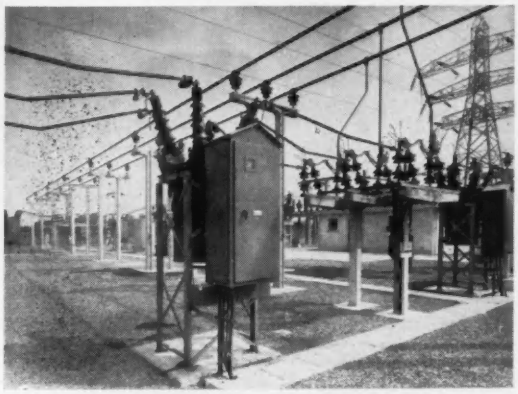
Councillor W. Fisher, chairman of Harlow U.D.C., and Mr. H. D. B. Wood, deputy chairman of the Eastern Electricity Board, watching Sir Richard Costain, chairman of the New Town Development Corporation, throwing the switch to bring Harlow West substation into commission

Perthshire Reinforcement

The Brush Electrical Engineering Co., Ltd., a member of the Hawker Siddeley Group, has recently supplied and erected a complete 33 kV substation for the North of Scotland Hydro-Electric Board at Coupar Angus, which forms part of the East Perthshire reinforcement scheme.

The equipment supplied includes 132 kV isolators and line insulators, the 33 kV isolators and neutral earthing equipment, five outdoor oil circuit-breakers of 500 MVA rating, a 6-panel control board and two tap change panels and small unit type fuse-switchboard for the auxiliaries. The 33 kV circuit-breakers are Type "OR" fitted with pneumo-hydraulic closing mechanisms, two of these oil circuit-breakers controlling 30 MVA transformers.

The building work for the scheme, including that which houses the various control panels, was carried out by the North of Scotland Hydro-Electric Board, and the consultants were Messrs. Kennedy & Donkin.



General view of the Coupar Angus substation. In the foreground can be seen the Brush 33 kV oil circuit-breaker, Type "OR"

Plant Extensions

During June new plant installed in Central Electricity Generating Board stations included a 30 MW Metropolitan-Vickers set at Bold "A" and a 30 MW Richardsons Westgarth set at Acton Lane "B."

OVERSEAS

Nuclear Power in Canada

The abundance of other energy sources and the scarcity of money and manpower are preventing an immediate expansion of large scale nuclear power development in Canada, delegates to the Chemical Institute of Canada convention were told.

Addressing the chemical engineering branch at the convention at the Wallberg Building, Toronto, where the University's sub-critical reactor is ready to go into operation, Professor D. G. Andrews, Associate Professor of Nuclear Engineering, said that on present showing, nuclear power in Canada would not be competitive until the late 1960s. Only a determined effort by all branches of Canadian industry could bring this date appreciably nearer. The role of the chemical engineer would be an important one if cheaper plants were to be built.

One important task was to find new and cheaper methods for production of heavy water, Prof. Andrews said. This remained an expensive item in reactors using it as a moderator. It would, in any case, be required on a large scale for the thermo-nuclear application.

Industrial Growth in Dominican Republic

The expansion in electricity supply in the Dominican Republic over the last two years has given added impetus to the country's industries. Nearly 2,000 new concerns have come into being and sales of Dominican industrial products have risen from $16 million in 1936 to $173 million in 1956. Electricity is also playing a big part in the agricultural development areas and in new settlements and towns.

Electricity output rose from 172 million kWh in 1956 to 192 million in 1957. This year, according to the State-owned Corporacion Dominicana de Electricidad, there should be a further rise to 230 million kWh. A $47·7 million programme will raise output to an estimated 537 million kWh by 1965.

CONTRACT INFORMATION

Accepted Tenders and Prospective Electrical Work

CONTRACTS OPEN

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses

Australia.—Department of Civil Aviation, Melbourne. 29th July. Line voltage regulators. (E.S.B. 16817/58. Ten/33334.)*

Victoria Railways, Melbourne. 30th July. Six 300 kVA transformers. (E.S.B. 17318/58. Ten/33437.)*

Director of Stores and Contracts, Postmaster-General's Department, Melbourne. 4th September. Diesel alternator sets, ranging from 1·5 kVA to 60 kVA. (E.S.B. 17052/58. Ten/33386.)*

Belfast.—31st July. Electrical installation in St. Rose's School for Girls. D. J. MacRandal, A.R.I.B.A., chartered architect, 17, Malone Road, Belfast.

Burma.—Burma Purchase Board, Rangoon. 24th July. Electric welding cable. (E.S.B. 17177/58. Ten/33406.)* Tensiometer cable and electric etching pencils. (E.S.B. 17179/58. Ten/33405.)* Ammeters and voltmeters. (E.S.B. 17176/58. Ten/33408.)* Electric motors. (E.S.B. 17178/58. Ten/33407.)* 28th July. Vulcanised rubber tape. (E.S.B. 17701/58. Ten/33510.)* Cable and lampholders. (E.S.B. 17539/58. Ten/33513.)*

Canada.—Manitoba Hydro-Electric Board, Winnipeg. 19th August. 600 V motor control centres for Selkirk power station. (E.S.B. 17147/58. Ten/33400.)*

Greece. — Public Power Corporation, Athens. 25th July. Circuit-breakers, switches and insulators. (E.S.B. 17460/58. Ten/33496.)*

Ministry of National Defence, Athens. 2nd August. Motor transmitters, morse keyboard, perforators and telegraph keys. (E.S.B. 16995/58. Ten/33390.)*

India.—Madras State Electricity Board. 30th July. H.v. insulators. (E.S.B. 17317/58. Ten/33436.)*

Andhra Pradesh Electricity Department, Hyderabad. 5th August. Twenty 3,000 kVA and thirty 500 kVA transformers. 8th August. Three 15,000 kVA, four 7,500 kVA, three 5,000 kVA, five 3,000 kVA, fifteen 1,500 kVA and two 1,000 kVA transformers. (E.S.B. 17319 and 17320/58. Ten/33443-44.)*

Iran.—Iranian State Railways, Teheran. 16th August. 4,000 semi-dry batteries. (E.S.B. 17291/58. Ten/33466.)*

London. — North West Metropolitan Regional Hospital Board. Firms wishing to tender for the installation of electrical services in a new hospital at Hatfield Hyde should apply by 26th July. (See this issue.)

New Zealand.—Christchurch Electricity Department. 29th July. Fifteen 300 kVA transformers and spare h.v. and l.v. bushings. (E.S.B. 17345/58. Ten/33429.)*

G.P.O., Wellington. 8th August. Capacitors. (E.S.B. 16796/58. Ten/33327.)* 19th August. Carrier deviation and distortion factor meters, and v.h.f. radio receivers. (E.S.B. 17348/58. Ten/33457.)* 21st August. Voltmeters, millivoltmeters, audio-output meters and radio frequency power output meters. (E.S.B. 17349/58. Ten/33458.)* 20th August. Oscilloscopes, valve testers and resistance-capacity bridges. (E.S.B. 17298/58. Ten/33490.)* 29th August. Headphones. (E.S.B. 17346/58. Ten/33452.)*

Newcastle-on-Tyne. — Education Committee. 2nd September. Electrical installation at East End Secondary Technical School for Boys, Benton Road. J. Atkinson, town clerk, Town Hall.

Rhodesia and Nyasaland.—Federal Tender Board, Causeway. 1st August. Line carrier equipment. (E.S.B. 17016/58. Ten/33430.)*

South Africa.—Stores Department, South African Railways, Johannesburg. 30th July. Batteries for electric locomotives. (E.S.B. 16958/58. Ten/33350.)* 1st August. Fluorescent lighting fittings. (E.S.B. 16953/58. Ten/33364.)* Lightning arrestors. (E.S.B. 16955/58. Ten/33363.)* 8th August. Direction boxes. (E.S.B. 17219/58. Ten/33447.)*

Union Tender and Supplies Board, Pretoria. 24th July. Armature winding wire. (E.S.B. 17242/58. Ten/33423.)*

Cape Town Electricity Department. 12th August. Street lighting lanterns. (E.S.B. 17001/58. Ten/33387.)*

Tyrone.—County Education Committee. 1st August. Electrical installation to new school meals kitchen and dining hall at Melmount, Strabane. Varming & Mulcahy, consulting engineers, 37, Malone Road, Belfast.

* Specifications may be inspected at the Export Services Branch, Board of Trade, Lacon House, Theobald's Road, London, W.C.1 (Chancery 4411; extension 769).

ORDERS PLACED

London. — Shoreditch Borough Council. Recommended. Installation of fluorescent lighting in Shoreditch High Street and Great Eastern Street, and replacement of existing tungsten lighting in various side streets (£3,076).—Harland & Wolff.

Reading.—Housing Committee. Electrical installations in 244 houses on the Whitley estate (£3,156).—Taylor & Goodman. Installations in 136 houses on the same estate (£2,130).—Southern Electricity Board.

Salford.—Housing Committee. Eighteen lifts for Lower Kersal housing scheme (£69,556).—Express Lift Co.

WORK IN PROSPECT

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors

Barnstaple.—Girls' secondary modern school, Braunton Road (£142,824); Devon county architect, 97, Heavitree Road, Exeter.

Barry.—Works extensions; J. Feltz & Co., Ltd., Sidroy Mills, Palmerston.

Billingham-on-Tees. — Houses (183); U.D.C. surveyor.

Blackpool.—R.C. church, Glastonbury Avenue; Fleetwood Construction Co., Ltd., 141, Poulton Road.

Chesterfield.—Works extensions; Chesterfield Tube Co., Ltd., Derby Road.

Chester-le-Street.—Proposed "motel" at Birtley; Matkin & Hawkins, architects, Barclays Bank Chambers, Fawcett Street, Sunderland.

Christchurch.—Flats (90), Somerford; New Forest Construction Co., Ltd., Christchurch Road, New Milton.

Coalville.—Aged persons' hostel (£55,775); Orton & Co., Ltd., builders, Hendon Road.

Corbridge.—Secondary school (£115,860); C. C. Brown, county architect, County Hall, Newcastle-on-Tyne.

Crook.—Houses (80), Willington; R. G. Finlay, Ltd., builders, Ryhope, Sunderland.

Darlington.—Works additions, Aycliffe trading estate, for Crowborough Engineering Works, Ltd.; Tarslag, Ltd., contractors, Tees Bridge, Stockton-on-Tees.

Durham.—Houses (40), Framwellgate Moor; Bell & Ridley, Ltd., contractors, North Road, Durham.

Falkirk.—Business premises, High Street (£47,000); J. Grant & Co., Ltd., Jamaica Street, Glasgow.

Gainsborough.—New Heapham Road Infants' School; county architect, Lincoln.

Hastings.—Printing works extensions, Prospect Place; F. J. Parsons, Ltd., printers, Cambridge Road.

Keighley.—Factory, offices and canteen, Dalton Lane; Alan Sunderland, architect, Barclays Chambers, North Street.

Kington.—Houses (46), Crooked Well site; E. Deacon, Ltd., builders, Victoria Road.

Kirkwall.—Theatre block and alterations to form outpatients' department, Balfour Hospital, for North Eastern Regional Hospital Board; secretary, 1, Albyn Place, Aberdeen.

London.—Office block, 30/34, Moorgate; Higgs & Hill, Ltd., builders, Crown Works, South Lambeth Road, S.W.8.

Dwellings (358), Ascot Street, West Ham; borough architect and planning officer.

Reconstruction of Bow Baths, Sutherland Road, Poplar (£62,925); borough engineer, Poplar Town Hall, Bow Road, E.3.

Maidenhead.—Laboratories and offices; County Laboratories, Ltd., Honeypot Lane, Stanmore, Middx.

Manor Park.—R.C. church, Ilford Lane; Burles & Newton, architects, 25, Bedford Row, London, W.C.1.

Middlesbrough.—Houses (23), Easterside; J. Gilmore, Ltd., builders, Marton Road.

Newcastle-on-Tyne.—Houses (152), Newbiggin Hall, and improvements to St. Aloysius R.C. School (£58,000); city architect, 18, Cloth Market.

Oxford.—Further instalment of technical college, Headington Road, Gipsy Lane; city architect, Town Hall.

Pembroke.—Houses (43), Merchants Park; W. B. Kavanagh, borough engineer, Municipal Officer, Pembroke Dock.

Perth.—Multi-storey flats on site of old St. Stephen's Church, Paradise Place; burgh surveyor, 16, Tay Street.

Peterborough.—Shops and maisonnettes, Walton estate (£20,427); W. Ferrar & Sons, Ltd., Thistlemoor Road.

Peterlee (Co. Durham).—Houses (566); W. J. Scott, chief architect.

Rhyl.—Extensions, Royal Alexandra Hospital; Welsh Regional Hospital Board, 5/7, Museum Place, Cardiff.

Rugby.—Assembly hall, kitchen and dining room for College of Technology and Art; J. Parnell & Son, Ltd., builders, Oliver Street.

St. Albans.—College of Further Education; Wm. Sindall, Ltd., builders, Gloucester Street, Cambridge.

Stockton-on-Tees.—Houses (300), Albany and Hardwick areas; borough architect, 28, The Square.

Housing estate (142 houses), Merrick Road; R. B. Bainbridge, builder, Prudential Buildings.

Houses (21), Hartburn Avenue; Ideal Builders, Ltd., Oakdene Avenue.

Sturminster Newton. — Modern school (£102,707); Hammond & Sons, Ltd., builders, Worton, Church Street, Sturminster Newton.

Sunderland.—Development of Town End Farm estate (2,000 houses); borough architect, Grange House, Stockton Road.

Welwyn Garden City.—Dwellings (203); U.D.C. surveyor.

Whittlesey.—Houses (32), Eastfield Drive; Council's surveyor, Whittlesey, Cambs.

Wigston Magna.—Houses (40), Horsewell Lane estate (£50,518); U.D.C. surveyor, Wigston, Leics.

York.—Extensions to new Earswick Joseph Rowntree School (£76,000); North Riding county architect, County Hall, Northallerton.

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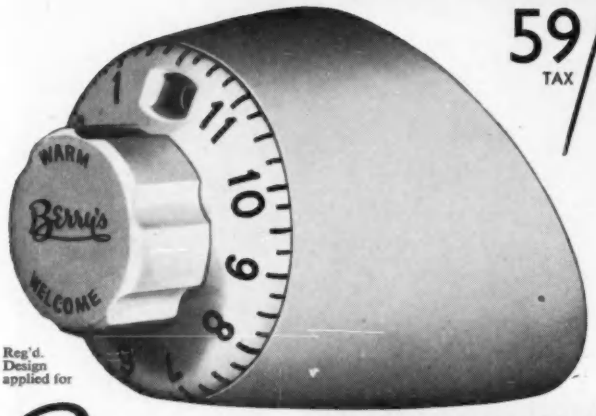

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Berry's WARM-WELCOME, available in Ivory or Mahogany finish, is provided with a trailing flex to which you connect a plug in the ordinary way. The flex of the appliance is then connected to the WARM-WELCOME. The unit itself fits neatly on the skirting. It can be moved with a portable appliance to any room in the house without breaking the electrical connections.

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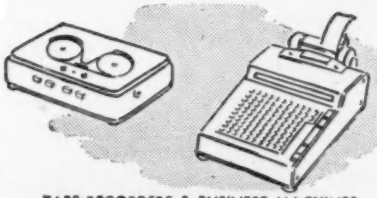

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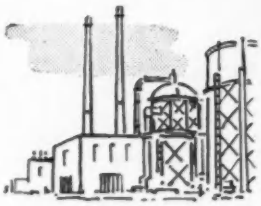

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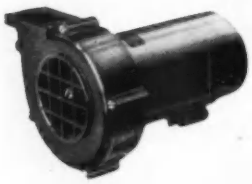

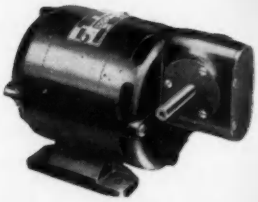

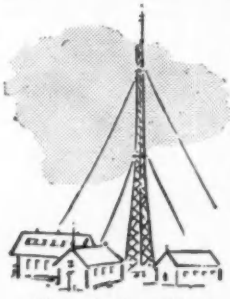

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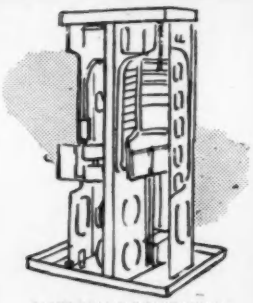

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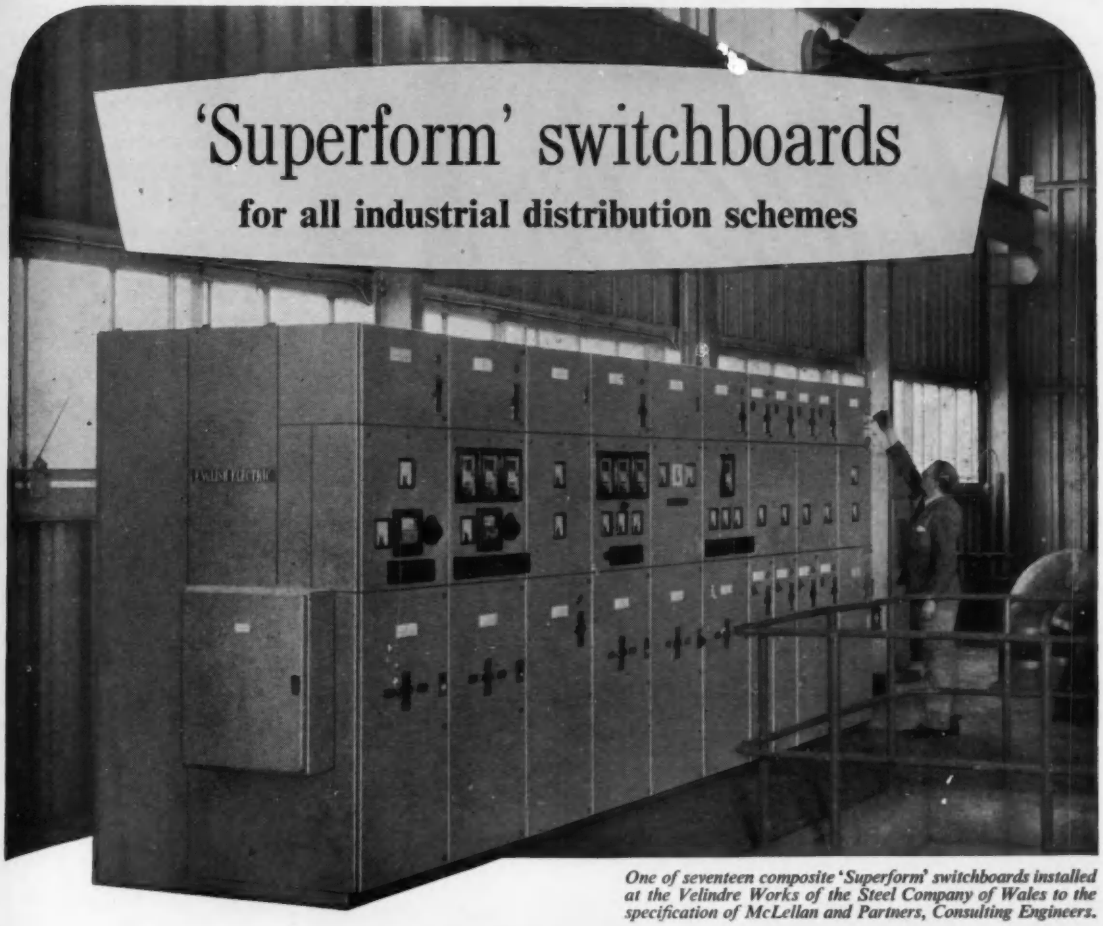

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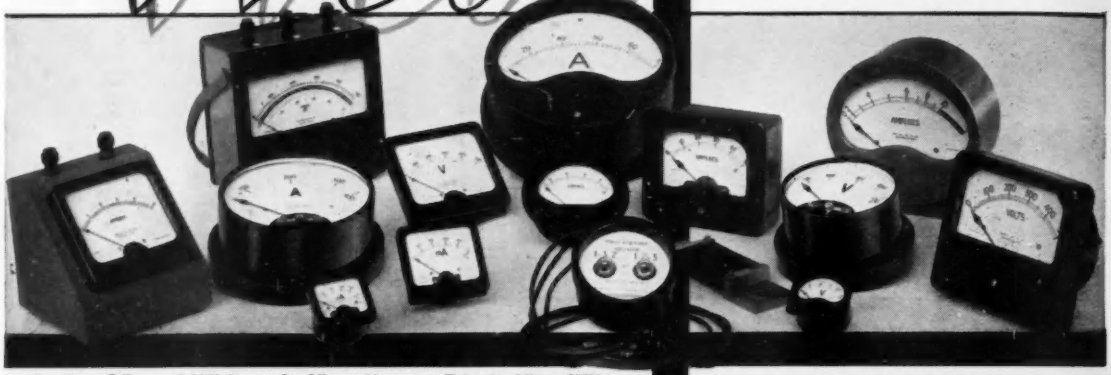

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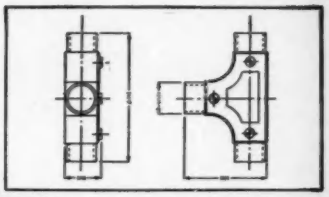

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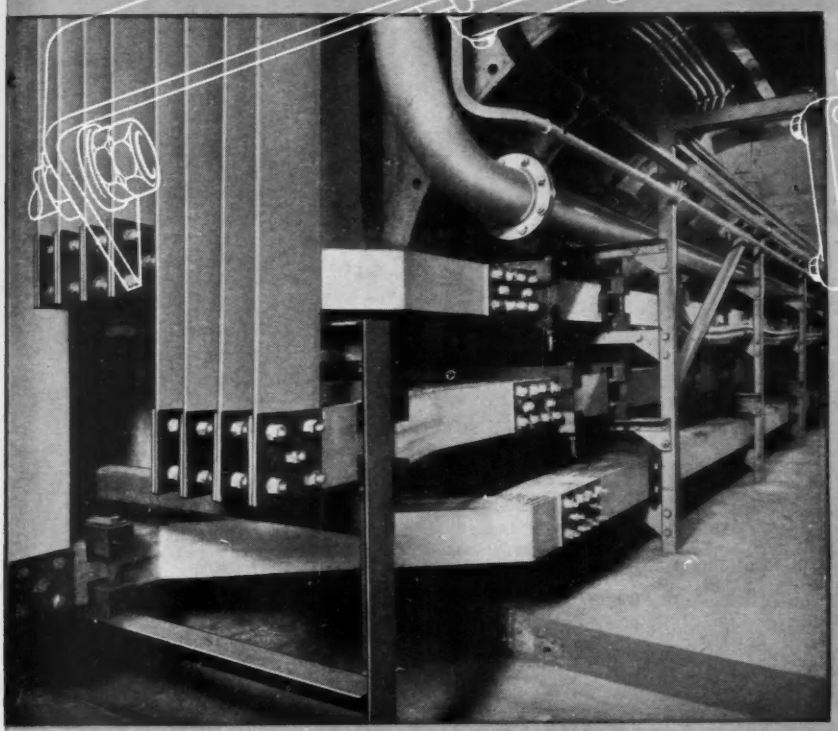


Aluminium for busbar is no longer a novelty—experience has proved its right to be considered on equal terms with copper. Sometimes, conditions will weigh the balance in favour of the more conventional material. In many instances, aluminium is more economical and equally efficient, particularly when 'Kynal' Busbar Jointing Compound is used to ensure strong, corrosion-resistant joints.

I.C.I. Metals Division, which supplies both copper and aluminium busbar, recently chose aluminium for a vitally important installation—at its titanium melting plant in Birmingham. Now giving complete satisfaction in service, this 'Kynal' busbar installation made possible a saving of 40 per cent in initial cost.

the name is 'KYNAL'

IMPERIAL CHEMICAL INDUSTRIES LIMITED, LONDON, S.W.1

ICI METALS DIVISION

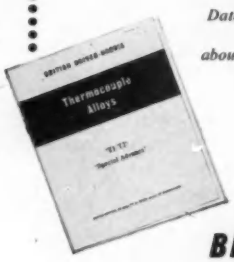
KL13

Electro Motive Force measured for industry

What do you look for in thermocouple wires? Consistent EMF values? Stability? Long life? Combinations for different temperature ranges?

British Driver-Harris thermocouple wires are manufactured to specifications which ensure that they are indisputably satisfactory on all four counts.

In our laboratories, a rigidly-enforced schedule of tests guarantees the quality and essential properties of every coil or spool of thermocouple wire we produce.



Data Sheet No. 2 gives basic information about our thermocouple alloys. Have you had a copy?

*REGD. TRADE MARK

T1/T2 are the only British-made wires of the nickel-chromium/nickel aluminium type for use at high temperatures and conforming to the British Standard Specification 1827:1952 within the usual tolerances. They also meet the requirements laid down in Air Ministry Specifications 1632 and 1705 covering extension leads.

Special Advance* wire (60/40 copper-nickel) is for use with copper up to 400°C and with iron up to 900°C. The EMF requirements of these two combinations vary according to individual specifications. Special Advance* wires can be selected in most cases to meet these varying demands within the usual tolerances.

Matched Advance* Iron Wires. The non-availability of a Standard Iron and the variation of EMF properties experienced with different iron supplies result in some difficulty in reproducing thermocouple EMF properties. To overcome this difficulty we are now able to provide a Special Iron wire matched with Special Advance* to meet certain standard EMF requirements within the normal tolerances.

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1908–1958 50 years ACHIEVEMENT IN ELECTRICAL ALLOYS

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. . . and still leading the cable industry. Read below and you will realize just why we are the first name in development, design and manufacture.

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1898	The first company to generate and supply power to Trafford Park.
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A COMPANY WITH A TRADITION —AND A FUTURE

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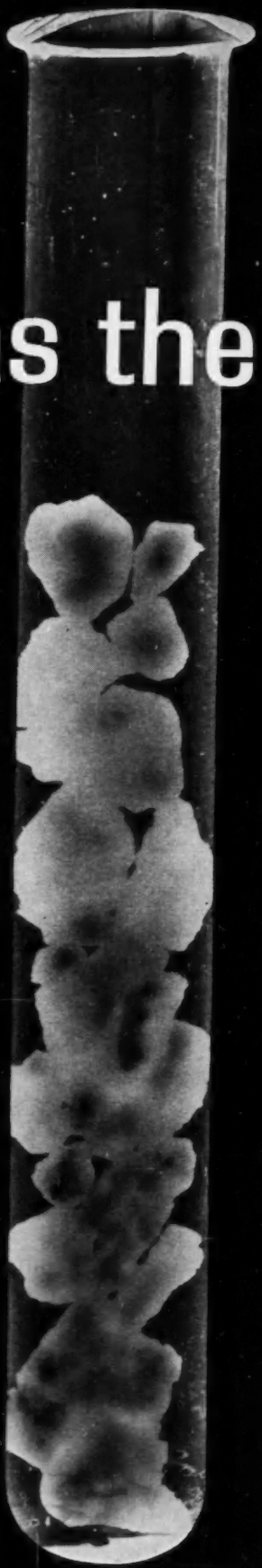
This was the shape of



# of oil after radiation

Here was a problem of national importance. Lubricants were needed by the nuclear industry for reactor equipment, much of it subjected to radiation. Yet, like human beings, oils and greases were vulnerable to radiation. Oils darkened in colour and became coarse-grained solids (solidification being but one of a tangled skein of problems).

The Shell Group started working on the problems of lubricating under radiation conditions while most nuclear power stations were still on the drawing board. In fact, Shell was the first oil company to develop Atomic Power Lubricants, and the research that went into Shell A.P.L. is characteristic of the way Shell sets about doing things. A team of research workers was assembled at Shell's Research Centre at Thornton. Series of tests were carried out both in the B.E.P.O. pile at the U.K. Atomic Energy Authority Research Establishment, Harwell, and with Thornton's own Cobalt 60 source of radiation. In 1957, after four years of research, Britain's first range of Atomic Power Lubricants was on the market.

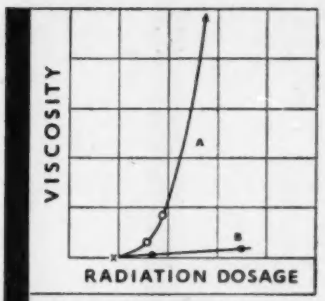
The moral of the A.P.L. story is that Shell research is supremely applicational. The Centre at Thornton is always ready to work with even the most specialised sectors of industry to produce the right oil for the job. If you and your organisation have any major lubrication problems, it will pay you to get in touch with your local distributor of Shell Industrial Lubricants.

The Research Story

In the hundreds of complex hydrocarbons examined, very different reactions to radiation were observed according to the configuration of the atoms in the molecules. When carbon atoms were arranged in long, straight chains, radiation caused these chains to link up with one another, giving highly complex structures of an entirely different nature from the original material. The first effect of this change was to cause a rapid increase in viscosity, ultimately giving rise to a solid rubber-like product.

For example, a high quality turbine oil conforming to BSS.489 receiving a dosage of 1.77×10^{18} neutrons/cm^2 was changed into an intractable solid—a clear demonstration that radically new lubricants were needed by the nuclear industry.

Shell Atomic Power Lubricants have a molecular structure that has proved itself very resistant to radiation. In fact it will withstand a radiation dosage four million times stronger than that which will kill a man—without any significant change in structure or physical properties.



Relationship between radiation dosage and percentage increase in viscosity, cS at 100°F.
Oil A: high molecular weight long chain hydrocarbon. *Oil B:* Shell A.P.L. 731.

SHELL

ATOMIC POWER LUBRICANTS

another proof of Shell leadership in Lubrication

Hunts capacitors for discharge lighting applications

New ranges of capacitors (Types L89/4 and L89/5) employing specially processed impregnants are now available. They are based on Hunts popular designs for fluorescent lighting applications. Full details freely available on request.

TYPE L89/5 STANDARD RANGE *(8 μF to 20 μF at 250 v A.C. wkg.)* *Temperature Range:* −40°C to +70°C, ideal for Street Lighting applications in all climatic conditions.

TYPE L89/4 "THERMINOL" RANGE *(8 μF to 30 μF at 250 v A.C. wkg.)* *Temperature Range:* −5°C to +70°C, this range offers a marked reduction in dimensions and is suitable for indoor and temperate climatic conditions.

TYPE L89/5

TYPE L89/4

* Streamlined design
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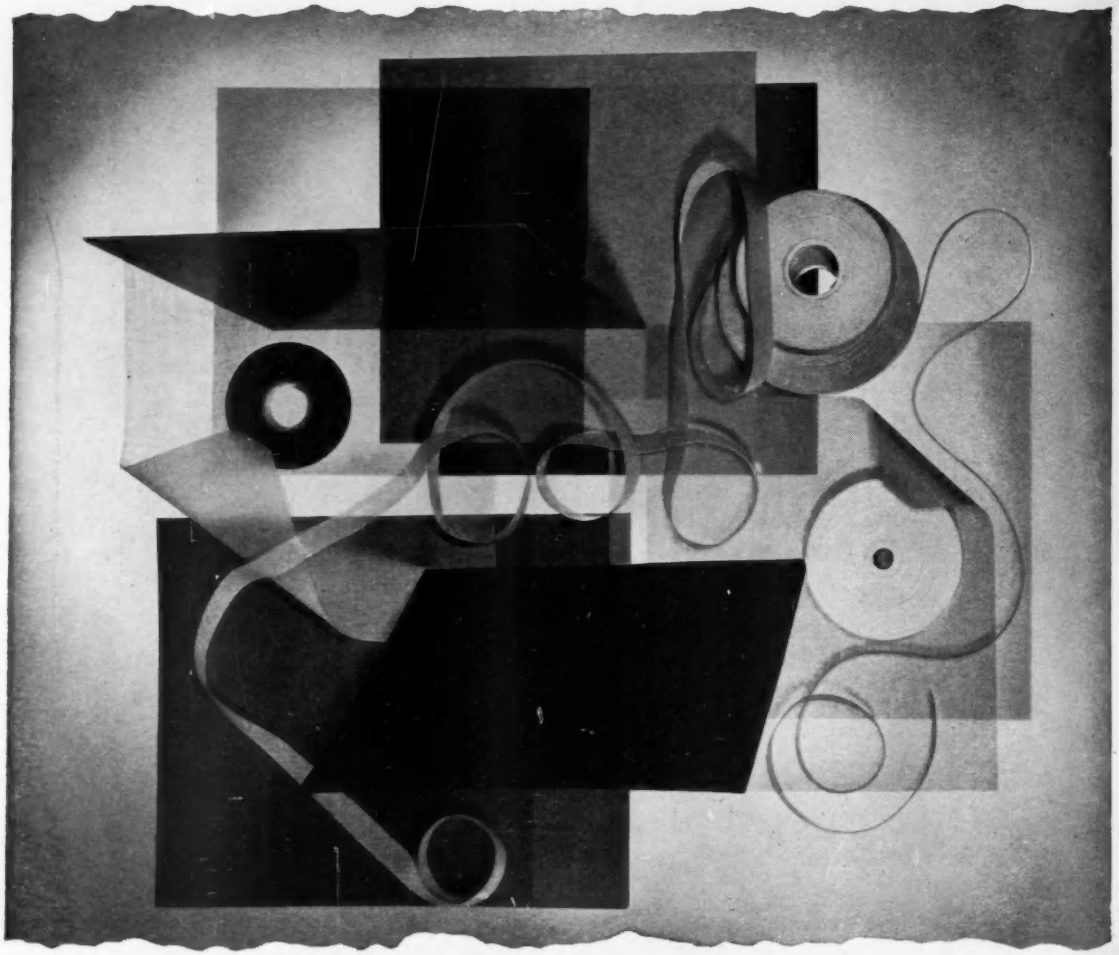

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Electro-Heat and Productivity

EXHIBITION & CONFERENCE

This event, organised by South of Scotland Electricity Board, will cover all aspects of industrial electric heating, including process heating, furnaces and ovens, welding and space heating; also associated equipment in the fields of instrumentation, testing, control, mechanical handling, etc. The Exhibition will probably be the most comprehensive of its kind ever to be held in Britain.

Industrial concerns interested in exhibiting are invited to apply to the Board without delay.

November 10th-14th, 1958 · *KELVIN HALL, GLASGOW*

SOUTH OF SCOTLAND ELECTRICITY BOARD

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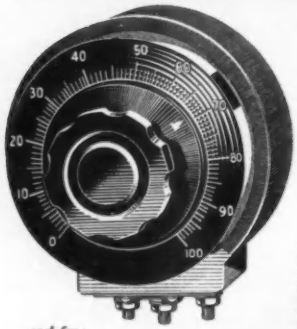
Consult **Birch**
REGISTERED TRADE MARK
for
TOROIDAL RESISTORS



FORMER : Patented ceramic moulding with horizontally opposed copper graphite internal brush movement.
WINDING : Best quality resistance wires to B.S.S. 115.

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Ferrule or wire end type : full range of 24 sizes — 1½ — 250 watts. List VE. 190.

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ELTRON for ELEMENTS

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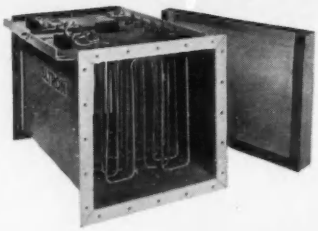

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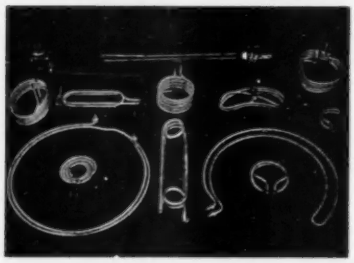

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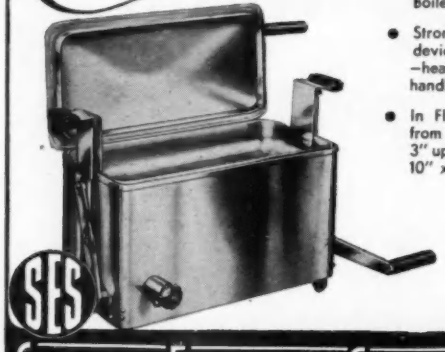
For Efficient Sterilization



- With Automatic Heat Control and Cut-out.
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- In FIVE SIZES from 9" x 5" x 3" up to 20" x 10" x 7".

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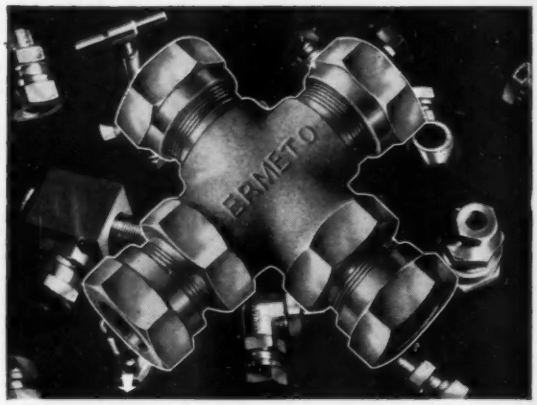

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ERMETO fittings are the internationally recognised method of coupling high pressure pipe lines. Enormous numbers are in use throughout the world.
Supplied in mild steel, stainless steel, brass, bronze and aluminium for all pipe sizes, standard and non-standard up to 2" o.d.

ERMETO
A wide range of valves also available. Catalogues on request.

BRITISH ERMETO CORPORATION LTD
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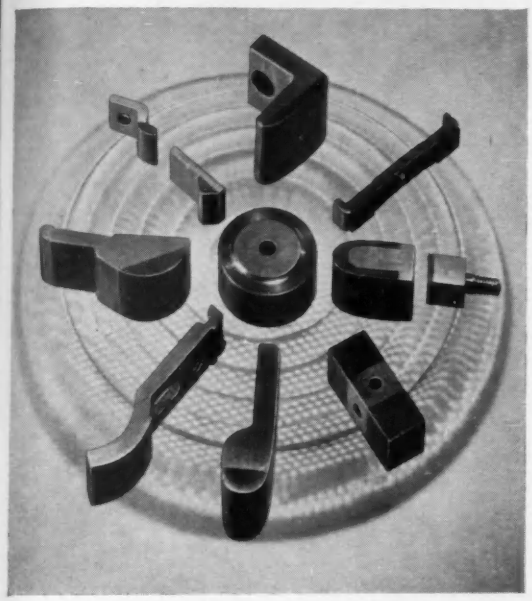
MAIDENHEAD
Tel. : Maidenhead 5100 (10 lines)



A selection of ELMET tipped contacts.

The uses of ELMET Sintered Compound Metals in Electrical Engineering

POWDER METALLURGY has enabled many problems to be solved by new and unconventional methods, and has enabled metals and compounds to be produced which have properties previously unattainable by normal metallurgical processes. The ELMET range of compounds provides an interesting example of this, comprising as it does a number of specially chosen combinations of metals which provide the electrical engineer with materials in which conductivity, hardness and arc-resistance are combined to a degree impossible with alloys of copper or silver. The majority of these compounds are based on metallic **tungsten**, whose high melting point, hardness and resistance to erosion by arcing lead to its use as a pure metal for relay contacts, make-and-break contacts, etc. Its low conductivity and its proneness to oxidation preclude its use in the majority of industrial applications and it is to fill the gap between tungsten and conventional copper and silver that the ELMET range has been developed.

By means of powder metallurgy techniques one can produce "compound metals" in which the two or more constituents do not alloy; they thus retain their own respective properties.

Hence a compound whose structure consists of a hard porous mass of tungsten, the interstices of which are completely filled with copper or silver, can be attained, which derives mechanical strength and arc resistance from the tungsten, coupled with electrical and thermal conductivity from the copper and the silver. By varying the proportions of the two metals, different combinations of properties result.

After many years' experience, certain well tried combinations have been adopted as standard and the ELMET range is made up as follows—

COPELMET (*Copper-Tungsten*) in four standard combinations
SILVELMET (*Silver-Tungsten*) in two standard combinations
SILNO (*Silver Nickel*)—one standard grade
SILNO 90 (*Silver Cadmium Oxide*)—one standard grade

Special combinations of the above are also produced for specific applications, as also are special grades, such as, for example, Silver-Molybdenum, Copper-Tungsten-Carbide, etc.

These metals correctly applied, will give longer contact life, freedom from sticking and welding, increased safety under overload conditions, reduced maintenance and downtime, and may enable gear to be used in more arduous conditions.

The choice of metal and the method of application will naturally depend on the circumstances of each individual case. Amongst the many applications for which ELMET is used with great success may be mentioned the following—

Contacts for high voltage switchgear, circuit breakers, interruptors, on-load tap changers, contactors, controllers, starters and relays.

Other interesting applications are—

Facings for projection welding and butt welding electrodes or dies, radiation screening material, balance weights, and consumable electrodes for spark machining complicated shapes.

ELMET metals are normally applied in the form of tips brazed to copper or copper alloy bodies or with vacuum-cast copper backings. Brazing is quite straightforward using normal techniques and silver solder. Complete tipped contacts can be supplied ready for use, or alternatively tips can be supplied loose, or in some cases worn contacts can be recovered by re-tipping.

Full information is available on request: please ask for Publication MC1/2.

METRO-CUTANIT

METRO-CUTANIT LIMITED
Associated with Metropolitan-Vickers Electrical Co. Ltd.
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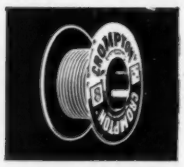
Broadway/mc2

...for that matter, what makes good electric cable?

A test bowler could not tell you how he co-ordinates speed, spin, trajectory, wicket-surface — and batsman's psychology: that is something his right or left hand knows.

In much the same way, engineering is often cleverer than it fully understands. In any firm with a long history the answers to many thousands of small technical problems have been absorbed so completely into normal manufacturing procedure that they have become a matter of course.

So, at least, we have found at Crompton Parkinson. We are reminded of it occasionally by a visitor exclaiming: 'So that's how it's done!' when he sees something we have come to take for granted. And, when you think of it, it is exactly this kind of knowledge that makes the difference between first-class electric cable and cable that meets the same specification.



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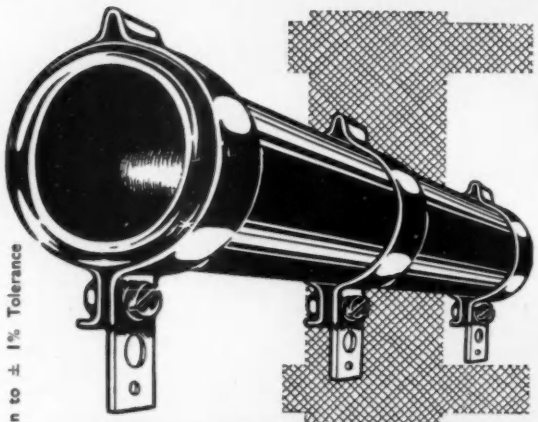

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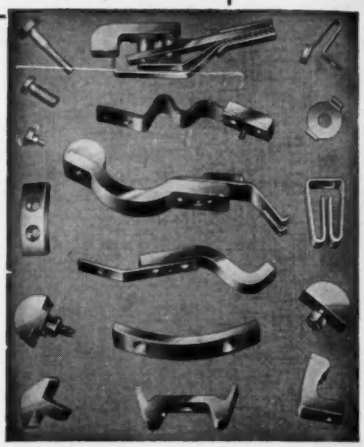

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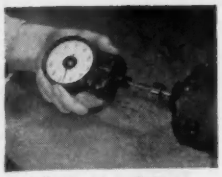


Indicating r.p.m. of electric motor.

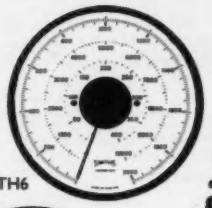
Indicating shaft speed, showing use of extension.

Indicating surface speed.

The Right REVS

Run your machinery at the optimum speed for peak efficiency. Any deviation from this speed almost certainly means that it—and you!—are running at a loss.

Cut this loss by making spot checks of r.p.m. with a SMITHS Hand Tachometer. Such a check can be made in an instant, even in unfavourable conditions. What's more, the reading is accurate to within ½%.



ATH6

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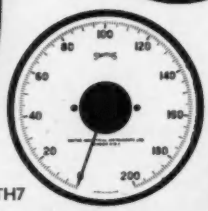

ATH7

ATH10

SMITHS HAND TACHOMETERS
can be used for checking:—

Rotational speeds of shafts, spindles, gears, rotors and rolls.

Linear speeds in ft/min or metres/min of metal strips, textiles, paper, wire, plastic, film and conveyed material.

Surface speeds in ft/min or metres/min of cutting or grinding operations of machine tools, processing rolls, unwind rolls or wind up rolls for extrusion and strip production.

Readings can be taken in bad lighting conditions or where the dial is visually obscured.

AVAILABLE IN CHOICE OF FOUR MODELS:—

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Model A.T.H. 7	**dial illustrated**	**(0-20,000 r.p.m.)**
Model A.T.H. 10	**dial illustrated**	**(0-5,000 r.p.m.)**

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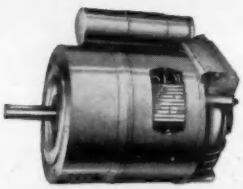
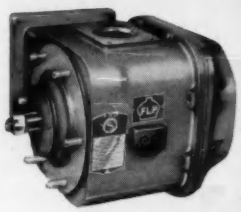
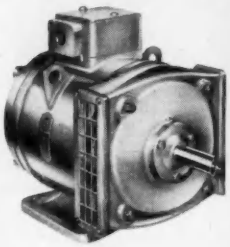
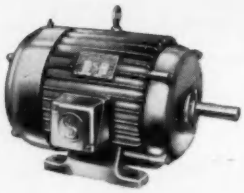


will serve you better

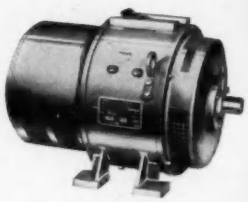






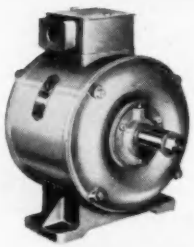
WE have an enthusiastic team of qualified engineers to study your problem.

WE have the most modern machine tools and methods for efficient and accurate production.



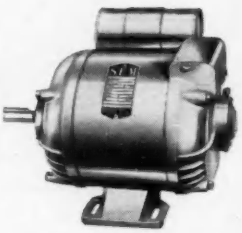
WE have more than 40 years' experience in the design and manufacture of Electrical Rotating Machinery.

WE offer you a technical service of the highest quality.



WE are keen to tackle your problem, whether it be electrical or Electro-mechanical.

Let us demonstrate what we can do for YOU, and remember S.E.M. is at YOUR service.



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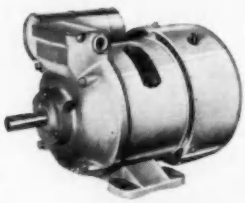

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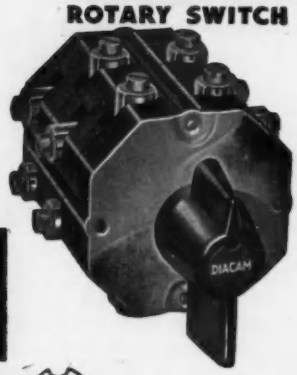

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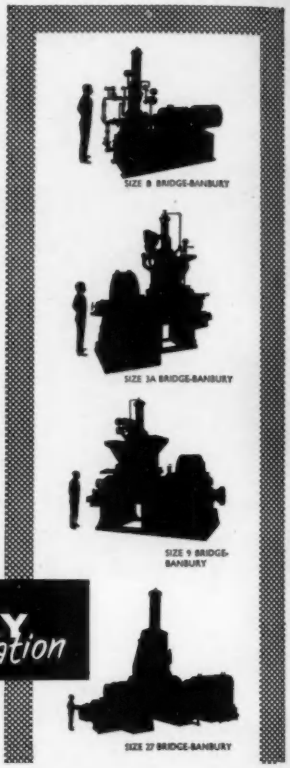

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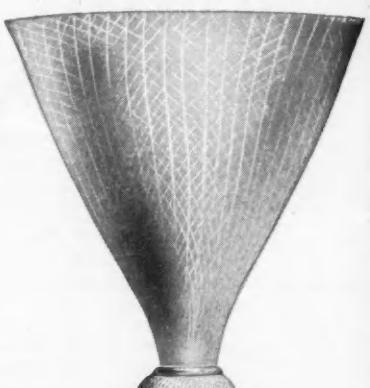

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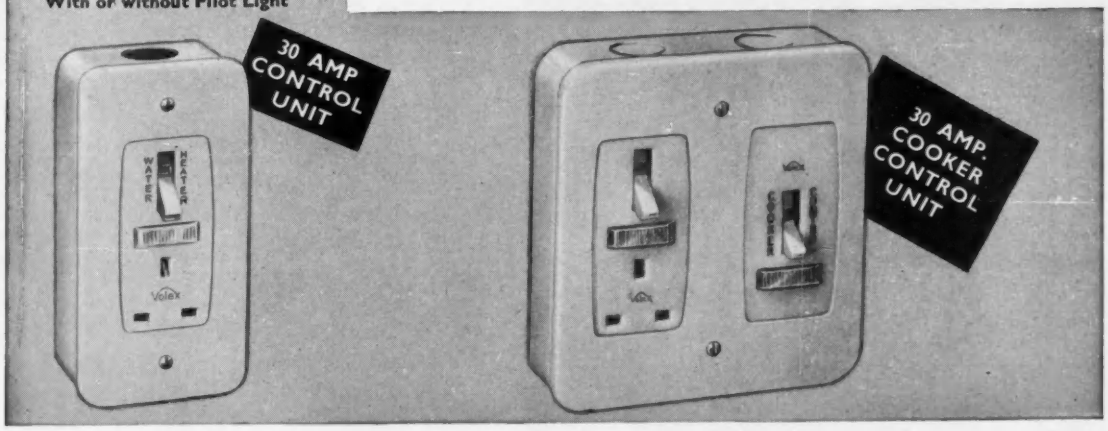

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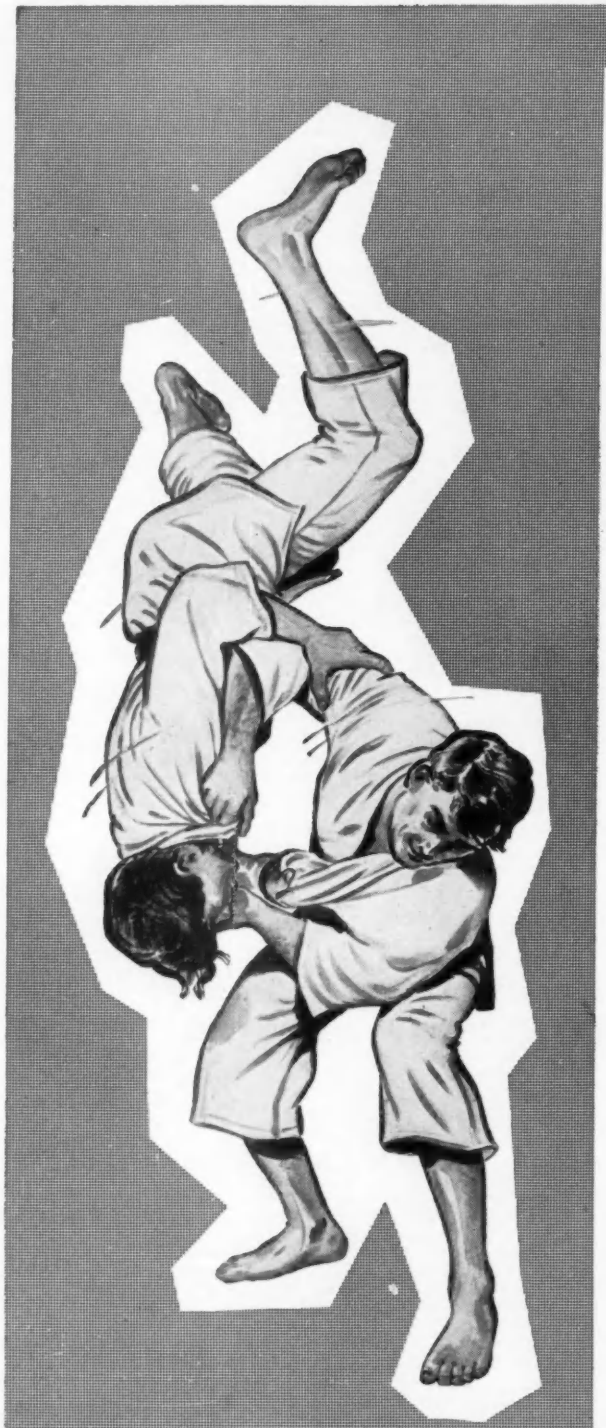

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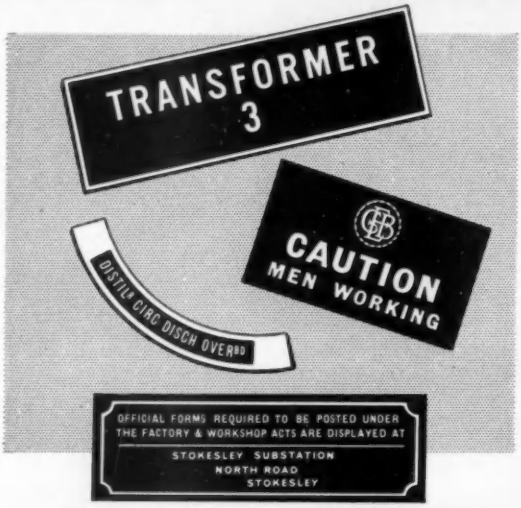

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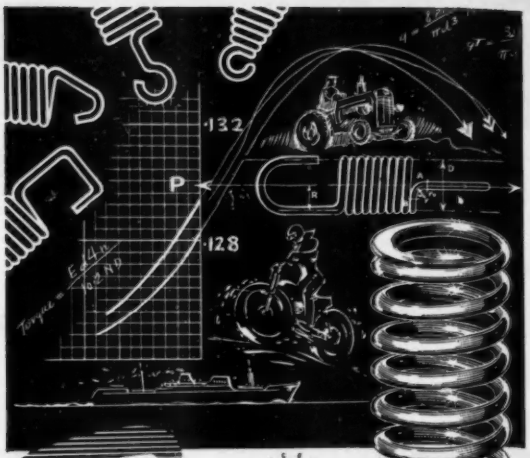

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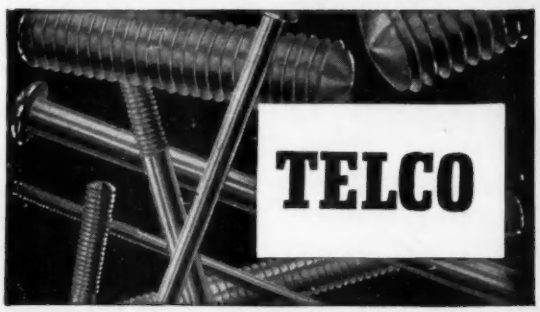

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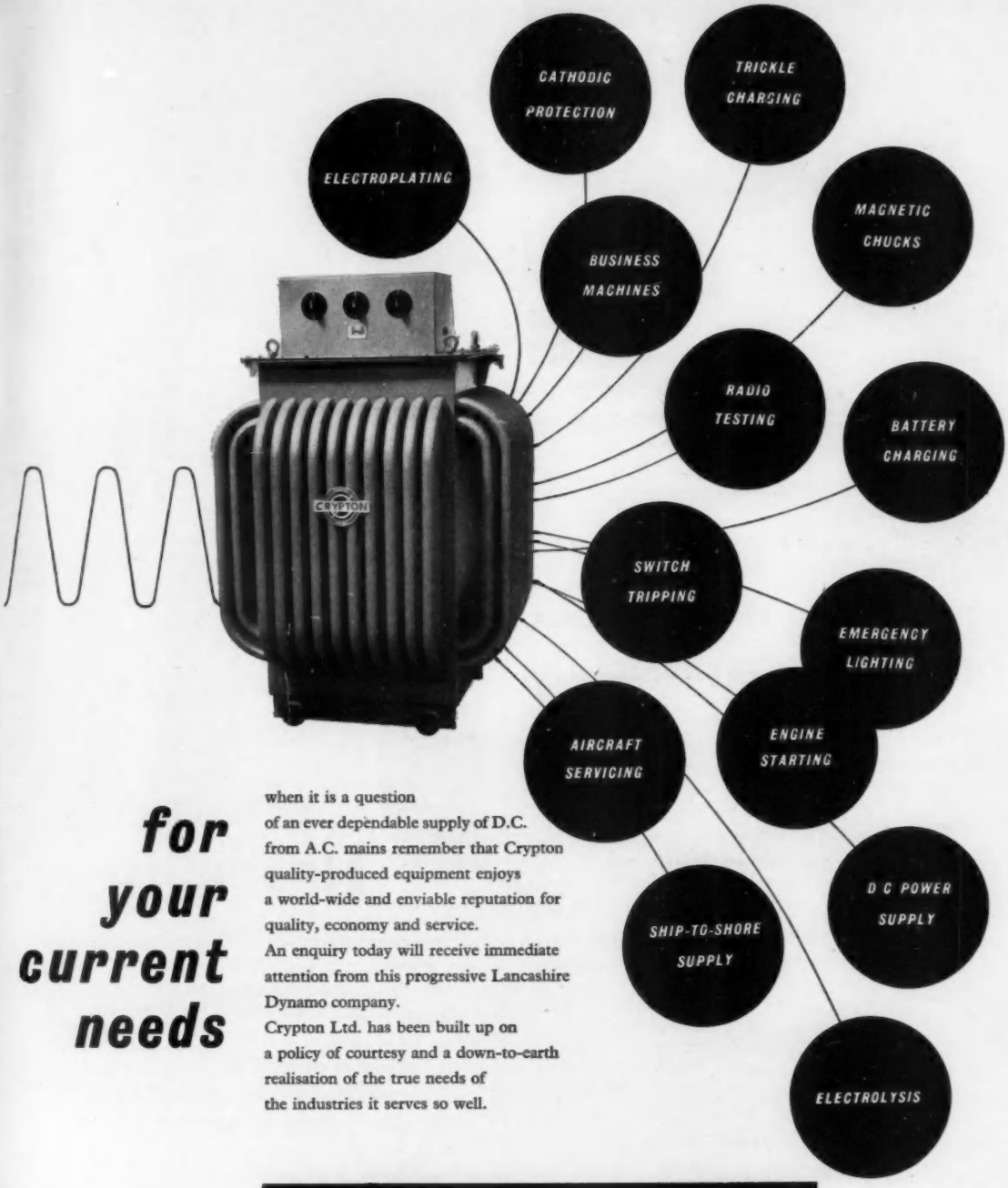

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P.665

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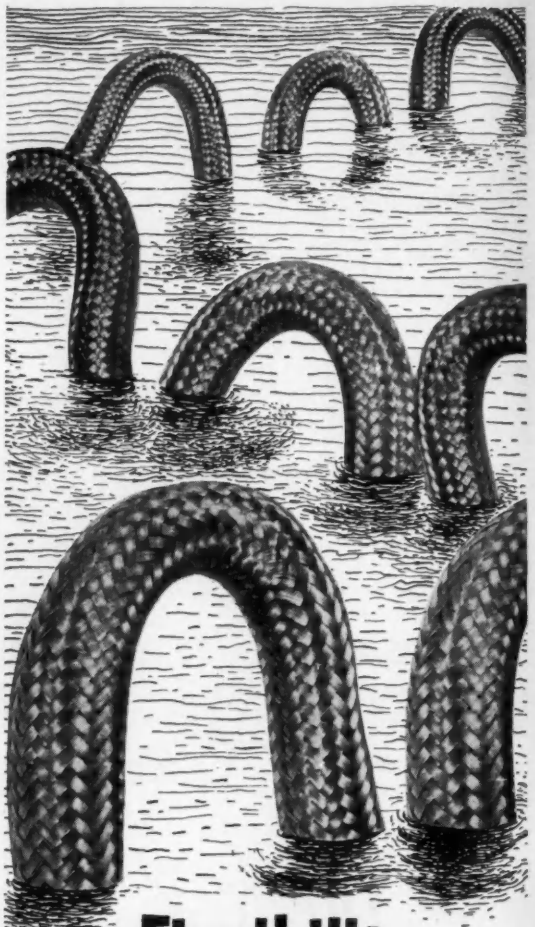

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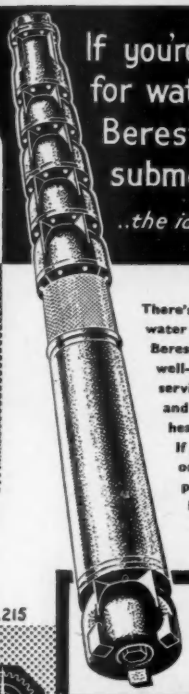
If you're in a hole for water-install a Beresford submersible pump...

..the ideal borehole pump



There's no better means of raising water from a well or borehole. The Beresford Submersible Pump is a sound, well-made pump, capable of long service, requiring little or no attention and it needs no pumphouse, cannot be heard and is installed out of harm's way. If you want to raise water—for a house or town—do it with a submersible pump—but remember that the Beresford is best in the long run. May we send you a copy of leaflet PF.310?

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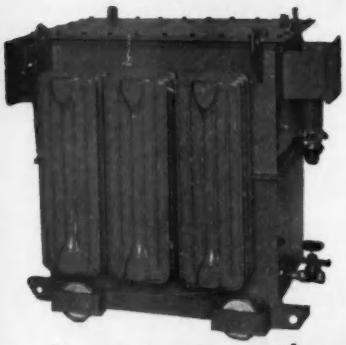
It's a **STURDY** *transformer . . .*



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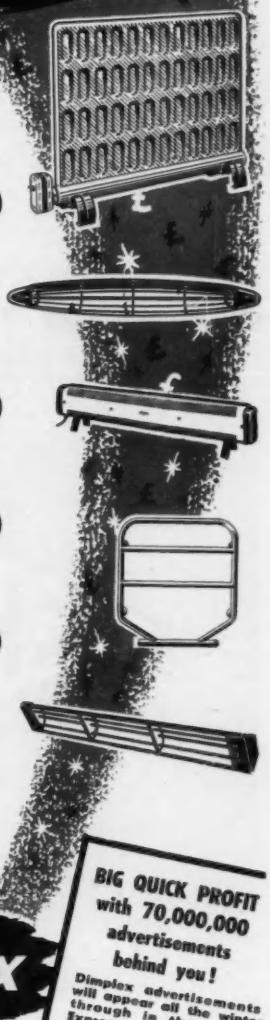

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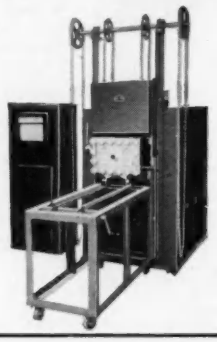
60 KW mechanically operated model. Internal dimensions 54" x 24" x 18"



Hand-operated model, fitted with self-contained atmosphere equipment. With two or more containers the furnace can be kept in continuous production.

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Insuloid cradleclip

this revolutionary system cuts wiring time by 50%

Just look at these features :—

- Combines high speed fixing with simplicity.
- Makes wiring systems neater and more compact.
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- Assured electrical and mechanical security in all conditions.
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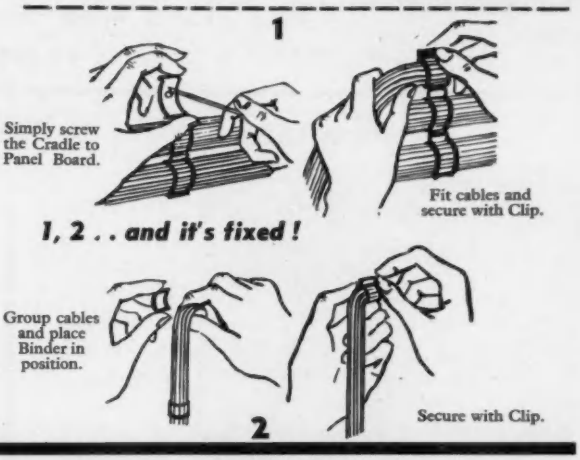
Twice as good . . . twice as quick . . . when you wire with Cradleclip !

More and more progressive Companies are switching to Cradleclip...No wonder, when you consider the remarkable versatility and proved economy of the Cradleclip system. Two simple movements and Cradleclip is truly fixed, quickly efficiently and neatly! Cradleclip, whilst being extremely simple in operation, sacrifices no point of technical efficiency and is suitable for service in all climatic conditions with a temperature range of −60° C to +100° C. Cradleclip is another Insuloid contribution to progress in electrical industry. We would be pleased to send you fully descriptive literature telling you all about the Cradleclip revolutionary wiring system on request.

And such simple components !

The Cradleclip system is compact from every viewpoint and consists of only 3 main components which are supplied in a range of sizes which provides for multi-purpose interchangeability. The illustrations below show how simply the components are used.


1
Simply screw the Cradle to Panel Board.
Fit cables and secure with Clip.
1, 2 . . and it's fixed !
Group cables and place Binder in position.
Secure with Clip.
2

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For time saving and greater efficiency in Wallmounted wiring.

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Shrunk-on hard plastic sleeving brings immediate savings in cost, time and production with increased efficiency and safety. Provides permanent dielectric non-ageing and "non-tracking" protection.

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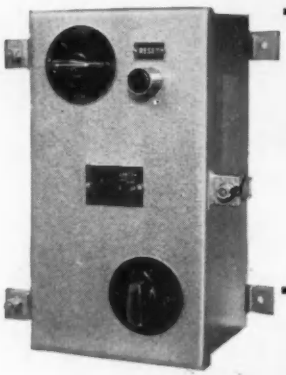
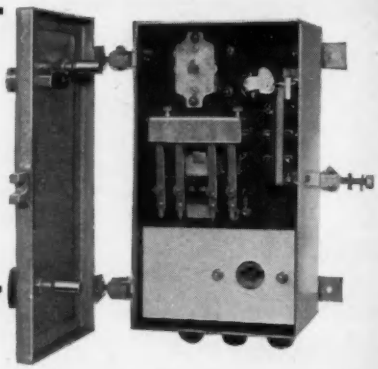


ACME

MOTOR CONTROL GEAR



For A.C. and D.C. applications

Illustrations show direct on line starter for 3 ph. squirrel cage motor up to 1 h.p. rating on 220/440 volts.
To 'Lloyds' requirements

AUTOMATIC OR HAND OPERATED STARTERS AND CONTROL PANELS

Compact in Size . . .
Competitive in price!

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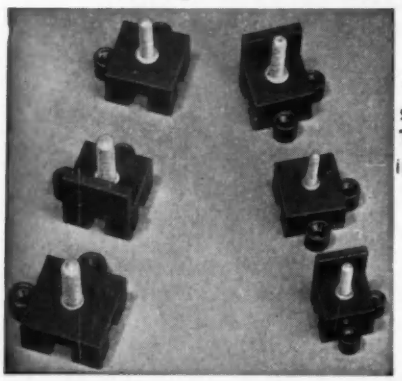
*No longer **NEW** but accepted.*



Unit construction **TER-MATE** inter-locking terminal blocks

Patented

Repeating orders and C S A Approval confirm the adaptability of these terminals which are now available in stud sizes ranging from 4. B. A. to 5/16" moulded in bases 5/8" square to 1 1/4" with or without barriers.

Any shape, any number of ways, anywhere, all as an integral unit, ideal for panels etc.

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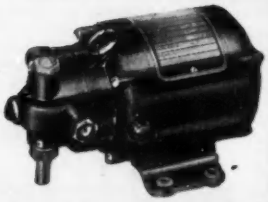
Output-shaft has 12 positions Integral Wormgear Reduction. Ventilated—Drip Proof. Vacuum Impregnated Windings. Dynamically balanced Armatures and Rotors.



SERIES WOUND GEARED MOTOR—Type 'K'			
R.P.M.	TORQUE	R.P.M.	TORQUE
600	10 oz. in.	37.5	4 lb. in.
300	16 oz. in.	25	4 lb. in.
150	24 oz. in.	18.8	4 lb. in.
100	32 oz. in.	12.5	4 lb. in.
75	36 oz. in.	9.4	4 lb. in.
50	3 lb. in.	6.25	4 lb. in.

SHADED-POLE INDUCTION GEARED MOTOR—Type 'FA'			
R.P.M.	TORQUE	R.P.M.	TORQUE
216	4 oz. in.	13.5	24 oz. in.
108	7 oz. in.	9	30 oz. in.
54	10 oz. in.	6.7	35 oz. in.
36	12 oz. in.	4.5	44 oz. in.
27	15 oz. in.	3.35	3 lb. in.
18	20 oz. in.	2.25	4 lb. in.

VARIABLE SPEED GEARED MOTOR—Type 'KQ'			
R.P.M.	TORQUE	R.P.M.	TORQUE
200-600	9 oz. in.	12-37.5	4 lb. in.
100-300	16 oz. in.	8-22	4 lb. in.
50-150	20 oz. in.	6-16.5	4 lb. in.
32-100	32 oz. in.	4-11	4 lb. in.
25- 75	40 oz. in.	3- 8.25	4 lb. in.
16- 50	48 oz. in.	2- 5.5	4 lb. in.

CAPACITOR INDUCTION GEARED MOTOR—Type 'N'			
R.P.M.	TORQUE	R.P.M.	TORQUE
456	8 oz. in.	28.5	3 lb. in.
228	13 oz. in.	19	4 lb. in.
114	21 oz. in.	14.2	4 lb. in.
76	26 oz. in.	9.5	4 lb. in.
57	32 oz. in.	7.1	4 lb. in.
38	44 oz. in.	4.75	4 lb. in.

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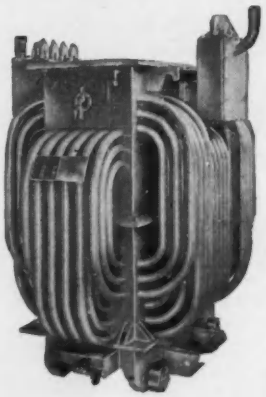
Transformers have, in the past, been missing from Verity's range of quality products. Now, through an arrangement with The Nelson Engineering Co. Ltd. the "Nelson" range of transformers are available. They are built to the same high standards expected of Veritys, meet British Standard specifications, and have many years of successful operational experience behind them.



Power transformers up to 1,000 kVA.

The Veritys 'NELSON' range includes

Power transformers up to 1,000 kVA.

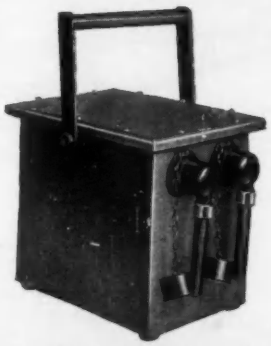
Pole and Platform types for rural distribution

Special versions for industrial applications

Mining types to N.C.B. requirements

Low-voltage transformers for use with portable power tools, hand lamps, etc.

We shall be very glad to send you further information.



Low-voltage transformer for use with portable tools and hand lamps, in steel, teak, and aluminium cases.

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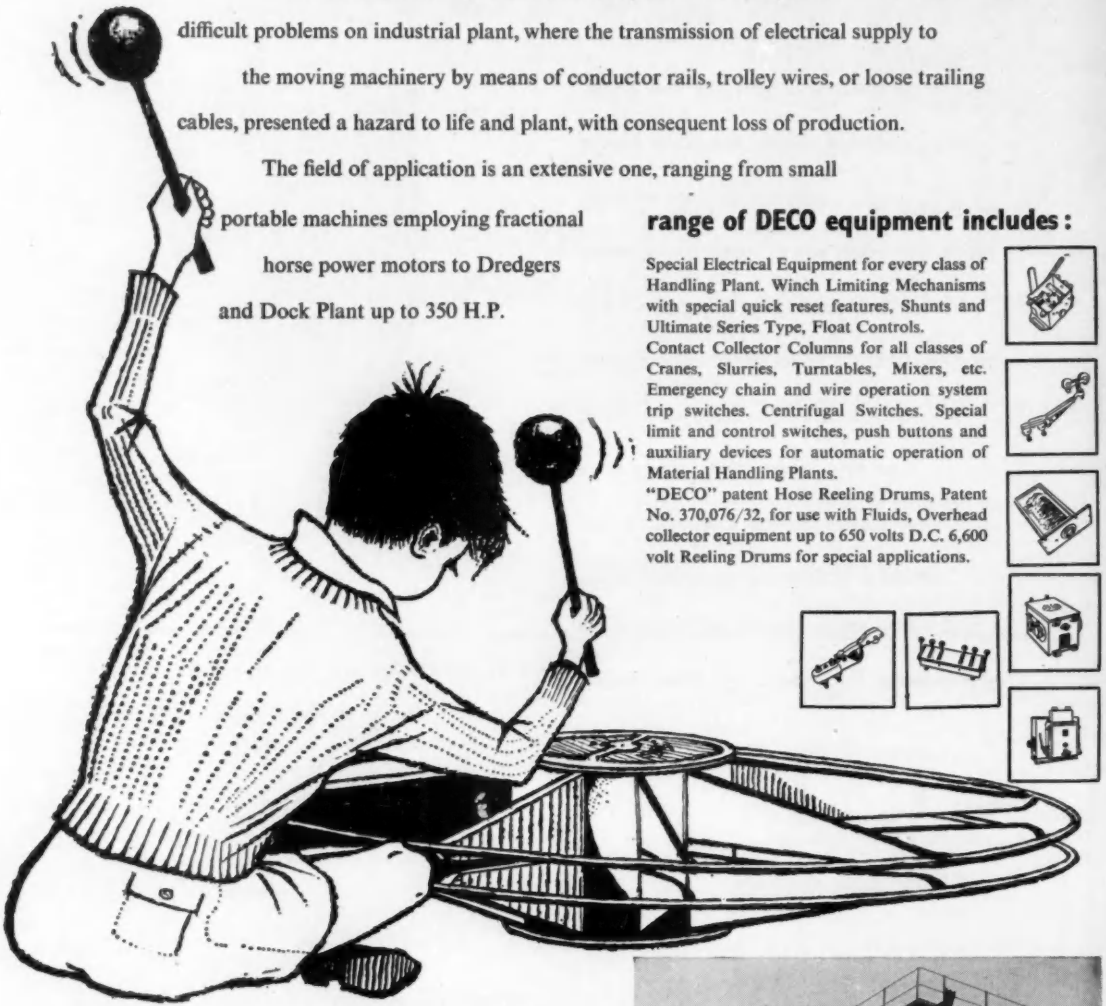
The field of application is an extensive one, ranging from small portable machines employing fractional horse power motors to Dredgers and Dock Plant up to 350 H.P.



range of DECO equipment includes:

Special Electrical Equipment for every class of Handling Plant. Winch Limiting Mechanisms with special quick reset features, Shunts and Ultimate Series Type, Float Controls.

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An illustration of a counter-weight operated radial reeling drum accommodating 130 feet of 4-core 1.3" overall diameter reinforced trailing cable for a 40-ton Goliath crane. (Photograph by kind permission of Messrs. Stothert & Pitt Ltd.)

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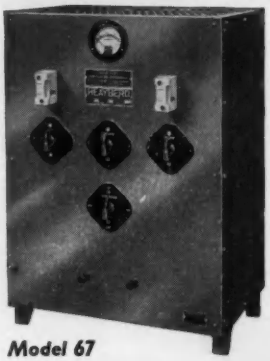

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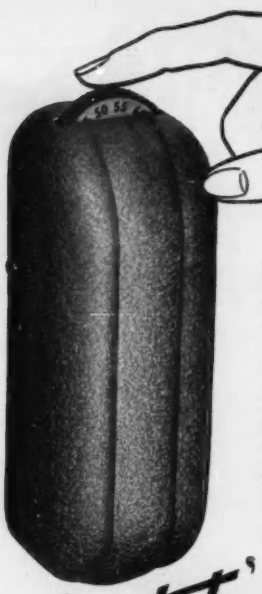

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POWER AND DISTRIBUTION TRANSFORMERS TO 100 kVA, LOW VOLTAGE FLASH TEST AND RECTIFIER UNITS, METAL WORK, LIGHT ASSEMBLY, SLOTTED ANGLES AND TRANSFORMER & ELECTRICAL REPAIRS

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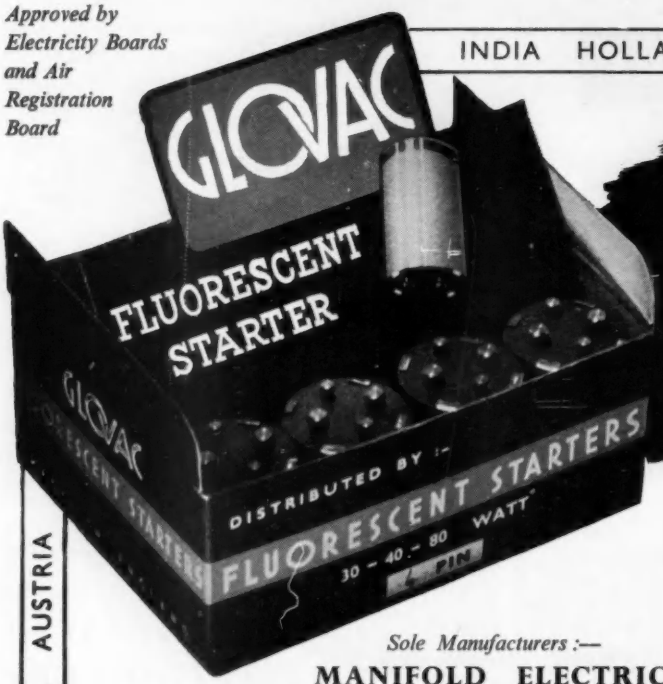

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Sole Manufacturers :—

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72" HIGH
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12" DEEP

- *Brand new—Manufactured in our own works*
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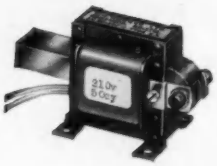

Increased Performance
Continuous 14 ozs. at ¾"
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Larger and Smaller Sizes Available. Greatly Increased Discounts for Quantities.
Also Transformers to 7 KVA 3 Phase

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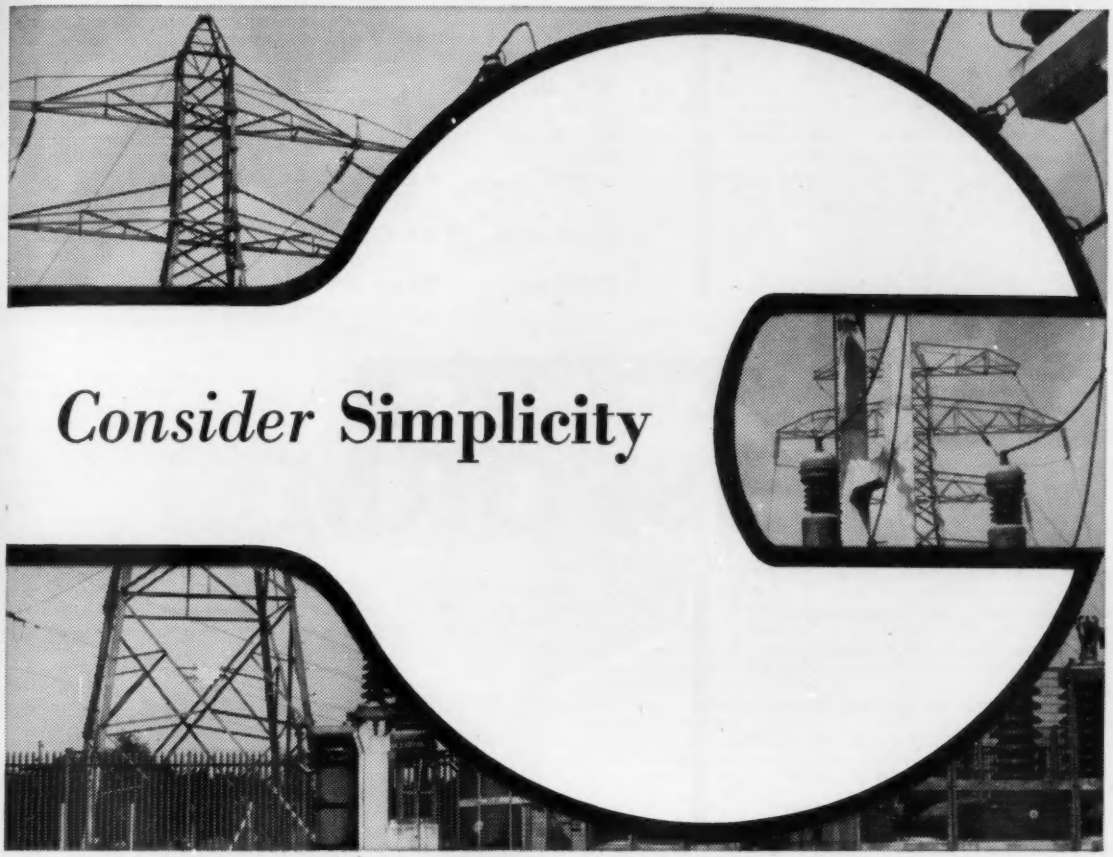
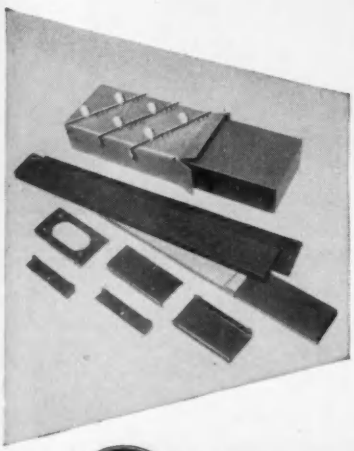


Consider Simplicity

in POWER FACTOR CORRECTION



Unit construction, so successful in other applications, now forms the basis of the most adaptable and efficient capacitor system available. The keynote is simplicity. With the new S.T.C. Unit Capacitor System, a number of units can be grouped together and interconnected to form capacitors up to 108 kVAr. **Assembly is so easy that it can be done on site using a single spanner.**

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Reduced weight and size make these capacitors ideal for wall or stanchion mounting. In addition, the increase of cooling surface in the multi-units provides a greater safety factor, and prolongs the already long life of *Standard* Capacitors.

Not least among their many advantages is the extremely low cost. Mass production and assembly from a few basic parts results in a considerable saving—this is automatically passed on to you.

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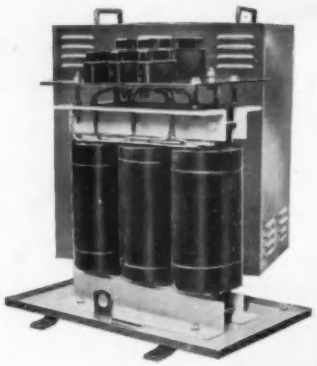

Quality Transformers
for all purposes
in silicon steel, grain oriented steel,
"C" cores, "E" cores, "Y" cores to
BRITISH STANDARDS SPECIFICATIONS
Chokes — Reactors

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Special department for prototype work and transformer repairs

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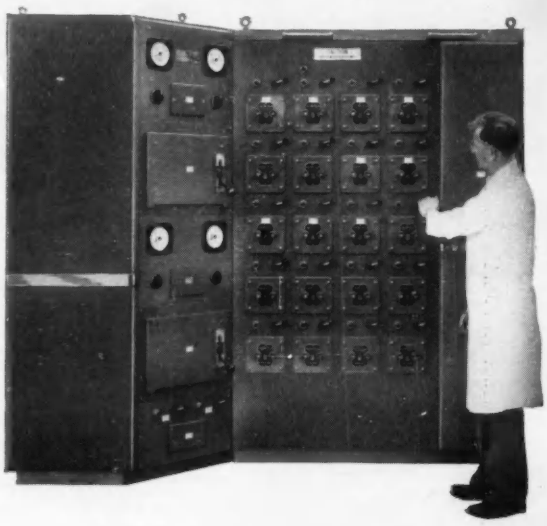

A section of a typical Control Panel made recently

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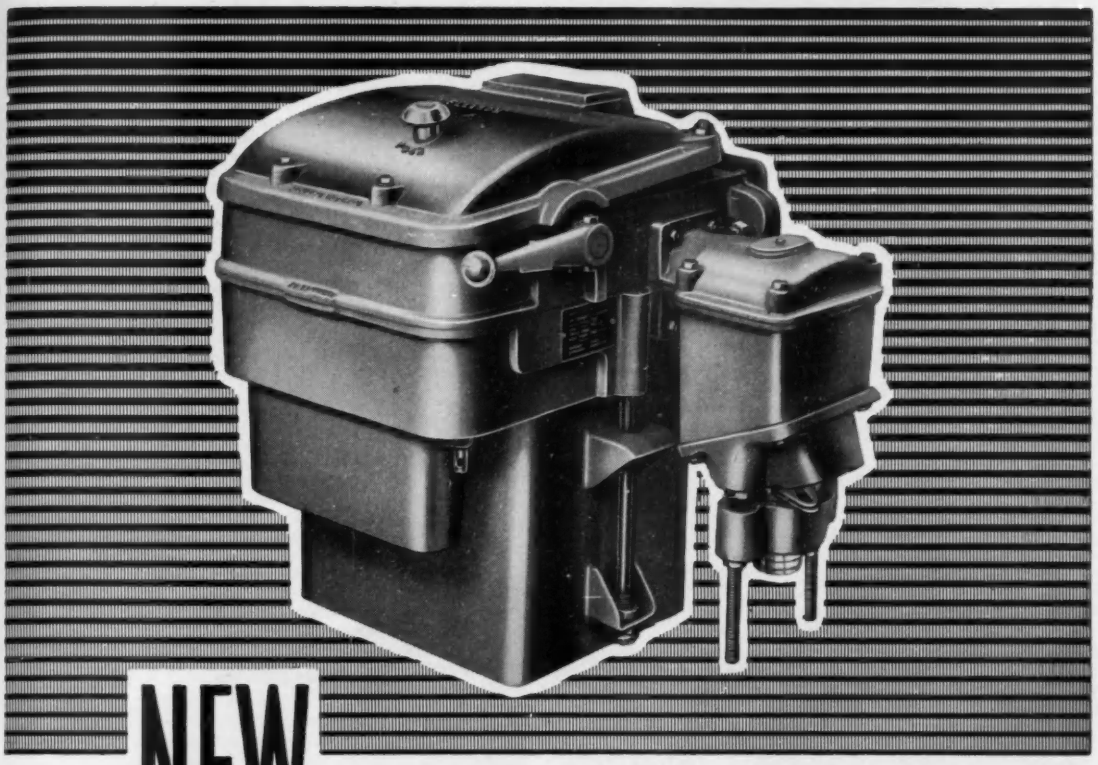


NEW non-drawout

ELLISON GEOF 400 AMP.

CIRCUIT BREAKER

The GEOF circuit breaker and direct-to-line starter, is designed for mounting on floor stands or for bolting to supports such as steel chambers or stanchions. Now in full production, this new circuit breaker possesses the main features of the successful GEO drawout range including:—*Reversible main and arcing contacts. Free handle on overcurrent. Series-connected, solenoid-operated overcurrent releases with time lags.*

Write for further particulars.

FOR SERVICE VOLTAGES OF UP TO 660

300 HP DIRECT-TO-LINE STARTER

A.S.T.A. TESTED TO B.S. 936:1940

BREAKING CAPACITY 25 MVA at 400 VOLTS

GEORGE ELLISON LIMITED BIRMINGHAM ENGLAND

Continuing a Tradition

788

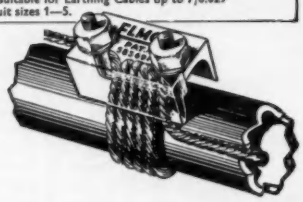
"ELMO"

EARTHING CLAMPS

A COMPLETE RANGE TO B.S.951. 1948 IN 4 SIZES

	A123	B45	C67	D0910
for earthing cables up to	7/0.036"	7/0.064"	19/0.064"	19/0.083"
to fit B.S. conduit sizes i.e. in trade terms	1, 2 & 3 ⅛" to ¾"	4 & 5 1" and 1¼"	6 & 7 1½" and 2"	8, 9 & 10 2½" to 3½"

NOTE ALSO: Type A123 is suitable for Earthing Cables up to 7/0.029" and for B.S. conduit sizes 1—5.



"Elmo" Earthing Clamps are of robust construction. Impossible for wire to pull out, always under tension, therefore a most satisfactory earth and a permanent safeguard

ELECTRICAL FITTINGS

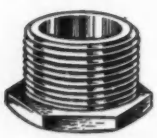
Flexible-to-rigid
CONDUIT COUPLINGS

Made in zinc base alloy in the following sizes

Electric Thread (Male)	⅜"	½"	1"	1¼"	1½"	2"
Inside Diameter	⅜"	½"	1"	1¼"	1½"	2"
Electric Thread (Male)			⅜"	½"	1"	1¼"
Inside Diameter Flexible Conduit			½"	⅝"	¾"	1"

WITH EARTHING TERMINAL

Special Features: Integral Earthing Terminal, tinned ready for soldering. Fixing screw for continuity. Internal threads suit all makes of flexible tubing.



MALE
Hex. Section

CONDUIT BUSHES

Made in the following sizes:

MALE: Electric Thread
⅜" ½" 1" 1¼" 1½" 2"

FEMALE: Electric Thread
⅜" ½" 1" 1¼" 1½" 2"

FEMALE
Flat Face Section for Spanner (except ½" size, which is round)

CONDUIT HOOK

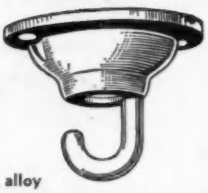
For fluorescent lamps and overhead lighting fittings. Screwed ⅜" male electric thread.

Made to fit all standard boxes with two holes 7/32" diameter — 2" centres diametrically opposed. Designed in accordance with British Standard Specification.

Both made in aluminium alloy

CEILING PLATE

One hook



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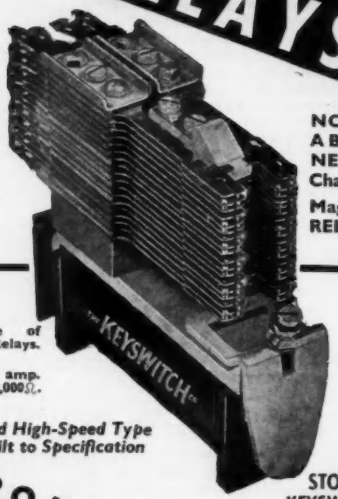

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CONTACTS: 300 m/A to 8 amp.
COILS: Up to 100,000Ω.

P.O. 600 and High-Speed Type Relays. Built to Specification

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to B.S.S., G.D.E.S., etc., specifications

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The Cable Clip is designed to 'push fit' on to the cable.
The carbon steel pin is already part of the unit and will drive into wood, plaster or mortar.

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ADVANCING with Aeroflex

HOPE'S PATENTS

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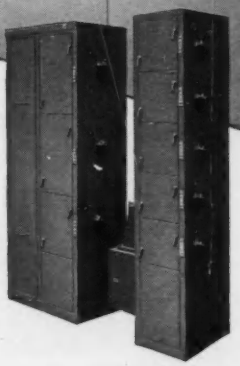
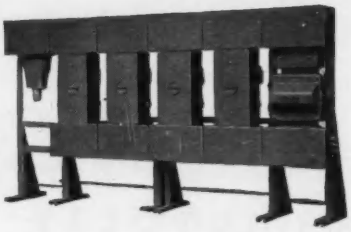
Fluvent Cubicle Type Switchboard recently supplied to British Crepe Ltd.



Fluvent Power Pillars—fully described in publication PP1, available on request.

ENERGY DISTRIBUTION FOR TODAY'S CONDITIONS

Energy Distribution for today's conditions demands fresh approaches. The examples illustrated are typical contributions by us to meet individual needs of widely different character.



Aeroflex Unit Type Switchboard, arranged so that any of the four outgoing circuits can be switched to either side of the busbars.

Parmiter Hope & Sugden Ltd

MANCHESTER 12

London: 34 Victoria Street, S.W.1. *Glasgow:* 5 Somerset Place, C.3 *Birmingham:* 39/41 Carrs Lane, 4

dm PH127

It's never too late
to see the
G.E.C.
about
space heating

Any time is the right time to see the G.E.C. about your heating; for the G.E.C. manufactures the widest range of industrial electric space heating equipment... to suit every type of industrial and commercial premises. And did you know the Company offers a free advisory service? Yes, the G.E.C. will plan schemes for you that add up to all-round economies... in layout, installation time and fuel consumption.

G.E.C.
INDUSTRIAL ELECTRIC SPACE HEATING

'Nightstor' heaters—
store by night, heat by day

overhead radiant heaters—
for economical and immediate warmth

unit fan heaters—
give an even flow of warmed air

Standard tubular heaters—
provide heat to measure from a wide selection of tube lengths

For further information, write for publication H5

THE GENERAL ELECTRIC CO. LTD., MAGNET HOUSE, KINGSWAY, LONDON, W.C.2

Classified Advertisements

CLASSIFIED advertisements are PREPAID at 3/6 per line (approx. 6 words) per insertion. Where an advertisement includes a Box Number there is an additional charge of 1/-.

DISPLAYED CLASSIFIED:—48/- per inch. Cheques and Postal Orders should be crossed and made payable to ELECTRICAL REVIEW PUBLICATIONS LTD.

SERIES DISCOUNTS for consecutive insertions:—13, 5%; 26, 10%; 52, 15%.

SITUATIONS WANTED:—Three insertions under this heading can be obtained for the price of two if ordered and prepaid with the first insertion.

REPLIES to Box Numbers should be addressed to the Box Number in the advertisement, c/o ELECTRICAL REVIEW, Dorset House, Stamford Street, London, S.E.1, but if not to be delivered to any particular firm or individual they should be accompanied by instructions to this effect, addressed to the Manager of the ELECTRICAL REVIEW. Replies in such cases cannot be returned. The name of an advertiser using a Box Number will not be disclosed.

ADVERTISEMENTS are accepted up to First Post on Monday of the week of issue and should be addressed to ELECTRICAL REVIEW, Classified Advertisement Department, Dorset House, Stamford Street, London, S.E.1.

Original testimonials should not be sent with applications for employment

OFFICIAL NOTICES, TENDERS, ETC.

NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD

New Hospital, Welwyn/Hatfield

Electrical Installation

APPLICATIONS are invited from firms wishing to be considered for inclusion in a panel of approximately 12 contractors to be invited to tender for the installation of the electrical services in the new hospital to be constructed at Hatfield Hyde, Hertfordshire.

Applicants are required to have experience of large scale contracts and be capable of undertaking work in the region of £100,000. Names and addresses of two professional engineers under whose supervision they have worked should be quoted.

Letters of application should be submitted to the Secretary, North West Metropolitan Regional Hospital Board, 11a, Portland Place, London, W.1, not later than noon on 26th July, 1958. 4156

SITUATIONS VACANT

FEDERAL POWER BOARD OF RHODESIA AND NYASALAND

APPLICATIONS are invited for the following appointments:—

TRANSMISSION ENGINEER.
Salary £2,500 p.a.

PROTECTION AND TELECOMMUNICATIONS ENGINEER.
Salary £2,250 p.a.

ASSISTANT ELECTRICAL CONSTRUCTION ENGINEER. Salary £1,750 p.a.

The board is at present constructing at the Kariba Gorge on the Zambesi a large dam and power station having an initial capacity of 600 MW and an ultimate capacity of, at least, 1,200 MW. It is also constructing about 930 miles of 330 kV transmission line to connect the Kariba power station with a number of thermal stations in the Federation.

Applicants for the post of transmission engineer should be fully qualified transmission engineers. Duties will be connected with the design, construction and maintenance of high voltage transmission lines and some aspects of maintenance in the Board's substations.

For the post of protection and telecommunications engineer applicants should be fully qualified and have a good knowledge of plant and transmission system protection. Duties will be connected with the installation and operation of protective gear in the Board's power station and substations and will involve other light electrical equipment including metering, telephone, telegraph, voice frequency and carrier communication equipment.

Applicants for post of assistant electrical construction engineer should be qualified engineers or graduates with experience in an engineering works or in the power supply industry. Duties will be to assist the Board's electrical construction engineer with the designing, construction and installation of electrical and mechanical plant.

All posts are subject to the Board's service and leave rules and successful applicants will be required to join the Board's pension fund.

Applications should be posted so as to reach the Secretary, Federal Power Board, P.O. Box 630, Salisbury, Southern Rhodesia, not later than 1st September, 1958. 4133

CENTRAL ELECTRICITY GENERATING BOARD

London Division

POWER STATION SUPERINTENDENT, BATTERSEA
(Vacancy No. 58/514).
POWER STATION SUPERINTENDENT, BARKING "C"
(Vacancy No. 58/515).

Applications are invited for the above mentioned vacancies in the London Division. Candidates should preferably be Corporate Members of a recognised engineering institution and have had extensive experience in the operation, maintenance and administration of a large power station, coupled with a successful record in personnel management.

Conditions of service will be in accordance with the National Joint Managerial and Higher Executive Grades Committee Agreement and the respective salary ranges (including London allowance) are as follows:—

BATTERSEA POWER STATION, Class D, Grade 5, £2,160/£2,360 per annum.

BARKING "C" POWER STATION, Class B, Grade 5, £1,760/£1,960 per annum.

Applications, quoting vacancy number, should be forwarded to Divisional Secretary, Central Electricity Generating Board, London Division, P.O. Box 136, Generation House, Great Portland Street, London, W.1, to be received not later than 28th July, 1958. 4174

SOUTH WALES SWITCHGEAR LTD.

Blackwood, Mon.

WE invite applications from capable young men possessing drive and initiative for the following positions in our rapidly expanding organisation. Candidates should preferably possess a Higher National Certificate or equivalent qualification but good experience in one or more of the following fields is considered to be of prime importance.

DESIGN DRAUGHTSMEN.
Experienced in the design of H.V. switchgear and associated equipment.

CONTRACTS DRAUGHTSMEN.
With experience in the application and layout of switchgear in one or more of the following fields:—
Outdoor and Indoor Substations.
Power Station and Industrial Switchgear.
Generator Busbar Trunking.

DIAGRAMS DRAUGHTSMEN.
Experienced in the layout and detail of protective and control systems, etc., covering all types of switchgear applications.

The vacancies occur in a modern factory located in pleasant surroundings within easy access of Cardiff and Newport.

Applications, which will be treated in the strictest confidence, should be addressed to the Chief Draughtsman. 4064

COUNTY BOROUGH OF WARRINGTON

Borough Engineer and Surveyor's Department

APPLICATIONS are invited for the following permanent appointment:—

ENGINEERING ASSISTANT
(Lighting), within Special Grade
(£750 to £1,030 per annum).

The appointment, which is terminable by one month's notice on either side, is subject to the conditions of service of the National Joint Council for Local Authorities Administrative, Professional, Technical and Clerical Services and the provisions of the Local Government Officers' Superannuation Act, 1937, the successful candidate (if a new entrant to the Council's service) being required to pass a medical examination.

Candidates should state the qualifications they hold.

The candidate appointed will be responsible to the Borough Engineer for the control of a small gas lighting department, the supervision of electrical lighting carried out by the agency an an electricity board, the preparation of new lighting schemes, and other general electrical work.

Housing accommodation will be made available if required.

The canvassing of members of the Council, either directly or indirectly, will be a disqualification, and applicants must state whether to their knowledge they are related to any member of the Council, or any co-opted member of a committee, or any officer of the Council. Failure to do so will disqualify or may lead to dismissal without notice.

No printed form of application is being used. Applications stating age, details of training and experience, qualifications, present and previous appointments (in chronological order), together with copies of three recent testimonials, or the names of three referees, should be forwarded to the undersigned so as to be received not later than 12 o'clock noon on Monday, the 28th July, 1958.

J. Y. HUGHES, M.I.C.E.
Borough Engineer and Surveyor.

Town Hall,
Warrington. 4117

T.V. AERIALS AND ACCESSORIES

SALES MANAGER REQUIRED
North West Area

APPLICANTS should possess a proved ability in actual selling, some established contacts with T.V. aerial users, and some sales control experience.

Commencing salary £1,000, with excellent prospects for advancement.

The prospective employers will not be made aware of applications until applicants' consent is first obtained.

Full details should be sent in complete confidence to:—

Morris, Gregory & Co.

3, York Street

Manchester, 2

4157

Situations Vacant (continued)

EASTERN ELECTRICITY BOARD

Suffolk Sub-Area

FOURTH ASSISTANT ENGINEER (Planning and Development Section), Sub-Area Headquarters.

The duties of the post are mainly field planning and candidates should have had a sound technical training and experience in the construction and operation of urban and rural distribution systems at voltages up to 33 kV.

It is desirable that candidates should have obtained the Higher National Certificate in Electrical Engineering or its equivalent.

Salary N.J.B. Class K, Grade 13 (£790-£835).

The successful candidate will be required to contribute to a superannuation scheme and may be required to undergo a medical examination.

Apply by letter, within 14 days, to the Manager, Suffolk Sub-Area, Eastern Electricity Board, Finborough Hall, Stowmarket, Suffolk. 4196

MANUFACTURING SUPERINTENDENT

wanted for

Electrical Switchgear Factory in

Johannesburg

The factory produces modern types of 6.6/11-kV oil circuit breakers, L.T. switchgear up to 600 volts, fuse gear, industrial control gear, etc., to British designs.

Applicants must have had experience in organising production of similar equipment in a modern factory in Britain and control of all grades of labour. A knowledge of cost control and expenditure budgeting is essential.

SALARY £130 PER MONTH, PLUS FREE PASSAGES FOR SUCCESSFUL APPLICANT AND FAMILY.

The Company operates a contributory pension scheme.

Apply giving age, training, past experience and other relevant details to:—

The Secretary

A.E.I. OVERSEAS LTD.

Crown House, Aldwych

London, W.C.2

4185

COUNTY BOROUGH OF BURTON UPON TRENT EDUCATION COMMITTEE

Technical College
Principal: E. White, M.Sc.(Econ.)

APPLICATIONS are invited for the post of SENIOR LECTURER in Electrical Engineering subjects who will be responsible to the Head of the Engineering Department for that Group of Classes. Salary will be in accordance with the Burnham Technical Scale and the successful candidate will be required to pass a medical examination.

Forms of application may be obtained from the undersigned upon receipt of a stamped addressed foolscap envelope, and must be returned within two weeks of the appearance of this advertisement.

A. H. BLAKE,
Director of Education.

Education Offices,
Guild Street,
Burton upon Trent. 4177

CENTRAL ELECTRICITY GENERATING BOARD

East Midlands Division

APPLICATIONS are invited for the following appointments in this Division :—

SENIOR DRAUGHTSMAN (Electrical), GENERATION CONSTRUCTION DEPARTMENT
(Vacancy No. 105/58/ER).

Candidates should have experience in the preparation of layouts and diagrams for the installation of E.H.T. and L.T. switchgear, transformers, E.H.T. and L.T. cables ; knowledge of protective gear systems would be an advantage.

Salary will be in accordance with Grade 5 (£760-£860 per annum) or Grade 4 (£895-£995 per annum) of Schedule D of the National Joint Board Agreement.

Closing date for receipt of applications, 23rd July, 1958.

THIRD ASSISTANT ENGINEER
(Electrical),
GENERATION (Construction) DEPT.
(Vacancy No. 108/58/ER).

Applicants should have had a fundamental training in electrical engineering, including workshops, and should preferably have had experience in the manufacture, erection and maintenance and operation of electrical plant as installed in modern power stations. Preference will be given to candidates who possess a Degree or are Graduate Members of the Institution of Electrical Engineers.

Salary will be within Class AX/EX, Grade 6 (£895-£1,140 per annum) of the National Joint Board Agreement.

Closing date for receipt of applications, 23rd July, 1958.

SENIOR DRAUGHTSMAN (Mechanical), GENERATION (Construction) DEPT.
(Vacancy No. 109/58/ER).

Applicants should have experience on one or more of the following :—

(i) Design and layout of power station equipment, including turbo-alternators, boiler plant, coal and ash plant and general station auxiliaries.

(ii) H.P. and L.P. steam and feed pipework. Condensing plant and feed heating systems.

(iii) Conveyor plant, coal handling systems and material handling of station auxiliary equipment.

Salary will be in accordance with Grade 5 (£760 - £860 per annum) or Grade 4 (£895-£995 per annum) of Schedule D of the National Joint Board Agreement.

Closing date for receipt of applications, 23rd July, 1958.

ENGINEERING DRAUGHTSMAN (Civil),
(GENERATION (Construction) DEPT.
NORTH WILFORD POWER STATION
(Vacancy No. 97/58/ER).

Applicants should have experience in design and detail of reinforced concrete structures, piled and slab foundations for heavy plant, culverts, cable subways, etc., for general building construction drainage and sanitation schemes, associated with official and administrative buildings.

The salary will be in accordance with Grade 6 (£595-£715 per annum) of Schedule D of the National Joint Board Agreement.

Closing date for receipt of applications, 23rd July, 1958.

These appointments will be pensionable under the terms of the Electricity Supply (Staff) Superannuation Scheme.

Applications should be submitted on the official form AE6/ACT, which may be obtained from the Divisional Establishments Officer, Central Electricity Generating Board, East Midlands Division, P.O. Box 25, Barker Gate, Nottingham, and should be returned to the undersigned by the date stated. PLEASE QUOTE VACANCY NUMBER.

L. F. JEFFREY,
Divisional Controller.

9th July, 1958. 4175

ASSISTANT ELECTRICAL ENGINEER

ELECTRIC motor control gear manufacturers require young assistant in design office with knowledge of electronics. Progressive position, contributory pension scheme.—Box 4086.

SOUTHERN ELECTRICITY BOARD

Local Engineer

Aldershot District of No. 3 (Portsmouth) Sub-Area, located at Petworth. Salary N.J.B. Class G, Grade 8 (£885 × £15 to £930 per annum). N.J.B. conditions of service.

The successful applicant will be responsible to the district engineer for the operation and maintenance of part of the distribution system up to 33 kV and comprising substations and U/G and O/H mains of all classes. He will also be responsible for the construction of minor mains extensions and services. Experience of similar work and possession of suitable technical qualifications would be an advantage. The appointment will involve standby duties.

Applications on forms obtainable from the Sub-Area Secretary, Lower Drayton Lane, Cosham, Portsmouth, and returned to him in envelopes suitably endorsed, quoting Z.926, not later than 28th July, 1958.

Fourth Assistant Engineer (Meters)

Sub-Area Engineering Department (Meter Section), of No. 1 (Southall) Sub-Area, located at Waterloo Road, Uxbridge, Middlesex. Salary N.J.B. Class L, Grade 13 (£885-£930 per annum, inclusive of London allowance). N.J.B. conditions of service.

Applicants must have had experience in a Class "A" Meter Testing Station and must be capable of supervising and co-ordinating the testing work in the department.

Applications on forms obtainable from the Sub-Area Secretary, 2/6, Windmill Lane, Southall, Middlesex, and returned to him in envelopes suitably endorsed, quoting Z.927, not later than 28th July, 1958.

General Assistant Engineer

Sub-Area Engineering Department (Meter Section), of No. 1 (Southall) Sub-Area, located at Waterloo Road, Uxbridge, Middlesex. Salary N.J.B. Class L, Grade 16 (£725-£770 per annum, inclusive of London allowance). N.J.B. conditions of service.

Applicants should have experience in three-phase meter testing, instrument transformer testing, assisting in the standardising of watt-meters and the commissioning of special equipment.

Applications on forms obtainable from the Sub-Area Secretary, 2/6, Windmill Lane, Southall, Middlesex, and returned to him in envelopes suitably endorsed, quoting Z.902, not later than 28th July, 1958.

The successful candidates for the above appointments will be required to contribute to the Electricity Supply (Staff) Superannuation Scheme, if eligible. 4198

CENTRAL ELECTRICITY GENERATING BOARD

South Wales Division
Vacancy No. 70/ER/58

APPLICATIONS invited for superannuable N.J.B. appointments in the DRAWING OFFICE GENERATION (Construction) DEPARTMENT, DIVISIONAL HEADQUARTERS.

SENIOR DRAUGHTSMAN
(Electrical).

SENIOR DRAUGHTSMAN
(Mechanical).

Salary Schedule D, Grade 4, £895 × £20 to £995 or Schedule D, Grade 5, £760 × £20 to £860.

ENGINEERING DRAUGHTSMAN
(Electrical).

ENGINEERING DRAUGHTSMAN
(Mechanical).

Salary Schedule D, Grade 6, £595 × £20 to £715.

Candidates should be suitably trained, possess an Ordinary or Higher National Certificate and be experienced in one or more classes of plant installed in power or sub-stations, such as:—

1. Boilers, conveyors, ash and coal handling, and station auxiliary plant.
2. Turbo alternators, H.P. and L.P. steam and feed pipework, condensing and feed heating systems.
3. Switchgear, transformers, cables, overhead lines; knowledge of protective gear advantageous.

Special application forms obtainable from Secretary, South Wales Division, Central Electricity Generating Board, Twyn-y-fedwen Road, Gabalfa, Cardiff, to be returned by 31st July, 1958. 4172

YORKSHIRE ELECTRICITY BOARD

No. 5 (Wakefield) Sub-Area

CASTLEFORD DISTRICT
DISTRICT COMMERCIAL ENGINEER.

Applicants must have considerable experience in service centre organisation and development, contracting, public lighting and the preparation of statistics and reports. They must be conversant with all matters connected with a district commercial organisation and have had experience of negotiations with industrial consumers and in the control of staff.

Preference will be given to applicants who are Corporate Members of the Institution of Electrical Engineers.

The successful applicant will be required to reside in the Castleford district.

Salary N.J.B. Class F, Grade 4, £1,065/£25/£1,140 per annum.

Applications giving full details of age, qualifications and experience, together with the names of two referees, should be forwarded to the Manager, No. 5 (Wakefield) Sub-Area, Yorkshire Electricity Board, 1a, Denby Dale Road, Wakefield, not later tthan 1st August, 1958.

No. 7 (Grimsby) Sub-Area

THIRD ASSISTANT ENGINEER (Distribution Design).

Applicants should possess at least the Higher National Certificate in Electrical Engineering and should be preferably Graduate Members of the Institution of Electrical Engineers. They should have experience in the design, construction, operation and maintenance of H.V. and L.V. underground and overhead distribution systems, substation plant and ancillary equipment.

Salary N.J.B. Class J, Grade 10, £885/£15/£930 per annum.

Applications giving full details of age, qualifications and experience, together with the names of two referees, should be forwarded to the Manager, No. 7 (Grimsby) Sub-Area, Yorkshire Electricity Board, Moss Road, Grimsby, not later than 1st August, 1958. 4209

A PROFESSIONAL ENGINEERING APPOINTMENT

in the field of

ELECTRICAL POWER SYSTEMS

THE ENGLISH ELECTRIC COMPANY, STAFFORD, is interested in appointing a qualified electrical engineer or physicist to conduct theoretical investigations and analytical studies into problems concerning electrical power systems.

Engineers with a keen analytical mind wishing to work in the challenging field of power systems engineering are invited to apply. This work offers an unusual opportunity to gain valuable experience in the generation and distribution of electrical power.

Please write, giving full details, to Dept. C.P.S., Marconi House, 336/7, Strand, London, W.C.2, quoting reference ER.1218X.

4158

SALES MANAGER

WELL-known radio components manufacturer with works in East Midlands and sales offices in London has vacancy for an experienced SALES MANAGER. A man of proved organising ability, sales initiative and drive will receive a generous remuneration. Only those who have held similar positions in the electronic or electrical industries and who possess a reasonable technical background should apply.

Write in confidence to Managing Director.—Box 4197.

IMPERIAL CHEMICAL INDUSTRIES LIMITED

WILTON WORKS

MIDDLESBROUGH

has vacancies for

ASSISTANT TECHNICAL OFFICERS

for

INSTRUMENTATION DEVELOPMENT

The Central Instrument Department at Wilton is developing the instrumentation of a large industrial Power Station and a number of chemical plants producing Nylon, 'Terylene,' Plastics, etc., making full use of the best modern techniques.

Applications are invited from men under 35 years of age, preferably with industrial experience, with Pass Degrees or Higher National Certificates or equivalent qualifications in engineering, physics or chemistry for this department.

After joining the staff married men receive a reasonable refund of removal and travel expenses, and facilities are available in approved cases for substantial loans for house purchase; legal charges will also be advanced. A lodging allowance will be paid to married men selected, whilst they are maintaining two homes.

Please write to: The Staff Manager, Imperial Chemical Industries Limited, Wilton Works, Middlesbrough, Yorkshire, quoting reference 516/6.

4137

CITY OF YORK EDUCATION COMMITTEE

York Technical College
Principal: R. Kagan, M.Eng.

Department of Engineering

APPLICATIONS are invited from suitably qualified persons for the following posts to commence on 1st September, 1958, or as soon as possible thereafter.

1. ASSISTANT LECTURER for electrical engineering and related subjects up to H.N.C. standard (Salary Grade B + £100).
2. ASSISTANT LECTURER for electrical and general subjects (Salary Grade B).

Grade B salary scale: £650 × £25 to £1,025 with up to £200 additional graduate and training allowances where applicable. In fixing the commencing salary account will be taken of teaching and industrial experience.

Further particulars and application forms obtainable, on receipt of a stamped addressed envelope, from the undersigned, to whom they should be returned by 31st July, 1958.

H. OLDMAN,
Chief Education Officer.

Education Offices,
5, St. Leonard's Place,
York. 4191

LONDON ELECTRICITY BOARD

Assistant Chief Accountant
Organisation, Methods and Mechanisation

APPLICATIONS are invited for the post of ASSISTANT CHIEF ACCOUNTANT, Organisation, Methods and Mechanisation in the Board's Headquarters Organisation. Applicants must have had wide experience in the formulation and application of accounting systems in a large-scale undertaking and be familiar with modern mechanised accounting procedures. Knowledge of the techniques of clerical method study and modern methods of costing and budgetary control will be advantageous, as will experience in the electricity supply industry and the possession of a recognised accountancy qualification.

The appointment will be made in Grade 7, Class C of the National Joint Managerial Agreement, the salary being within the range £2,360 to £2,560 per annum, inclusive of London Area allowance.

Applications, stating age, qualifications, present position and salary and containing full details of experience, should be forwarded to the Secretary, London Electricity Board, 46, New Broad Street, London, E.C.2, by 31st July, 1958, quoting Vacancy No. V/2499/R. 4201

CENTRAL ELECTRICITY GENERATING BOARD

Electronic Digital Computing Service

CHIEF ASSISTANT ENGINEER required in the System Planning Branch of the Planning Department at London Headquarters, S.E.1, to be responsible to the system planning engineer for the organisation and development of the electronic digital computing service. The computing section will be required to deal with a wide range of engineering and statistical problems and applicants should have had previous operational and management experience in this field and have an interest in computer design.

Corporate Membership of the Institution of Electrical Engineers and/or a University Degree in Physics or Mathematics would be an advantage.

Salary within scale £2,360–£2,560 p.a.

Applications stating age, qualifications, present position and salary should be forwarded to S. S. Scott, Chief Personnel Officer, Central Electricity Generating Board, 24/30, Holborn, London, E.C.1, by 31st July. Mark envelopes "Confidential-ER/201." 4199

BLACKPOOL EDUCATION AUTHORITY

Technical College and School of Art—
Engineering and Science Department
Principal: E. Shepherd, M.A.,
B.Sc.Hons. (Manc.), LL.B. (Lond.), F.R.I.C.
Barrister-at-Law

REQUIRED for September, 1958. ASSISTANT TEACHER Grade A, to teach electrical engineering subjects with radio bias. Experience in radio servicing is essential; applicants should hold the Radio Trades Board Certificate. Qualifications in television and/or telecommunications would be an advantage.

Salary Burnham Award Assistant Grade A, i.e. £475 × £25 to £900, with appropriate allowance for training, teaching and industrial experience.

Further particulars and forms of application obtainable from the Chief Education Officer, Education Offices, Stanley Buildings, Blackpool (stamped addressed envelope), should be returned within 14 days of this advertisement.

ERNEST C. LEE,
Town Clerk.

4200

SALES ENGINEER

to handle the sale of mining cables and electrical equipment to the mining and quarry industries in Scotland.

Technical training should preferably be to Graduate or Higher National Certificate standard in Electrical Engineering, and applicants should be in the age range 25/35 years. Previous experience in the mining industry would be an advantage.

Applications should be as detailed as possible and addressed to:—

Personnel Officer

(Home Sales Regions and Branches)

BRITISH INSULATED CALLENDER'S CABLES LTD.

Prescot, Lancs.

4179

DESIGNER/DRAUGHTSMAN

with experience in design of air break circuit breakers up to 2,000 amperes for medium voltage A.C. applications and complying with B.S. and A.S.T.A. requirements.

This post is permanent and offers excellent opportunity for man with initiative capable of accepting responsibility and working with minimum supervision.

Salary commensurate with experience and technical qualifications. Married man will receive assistance towards house purchase if necessary.

Applications treated in strict confidence.—Box 4138.

Situations Vacant (continued)

ELECTRICITY AUTHORITY OF CYPRUS

SHIFT CHARGE ENGINEER required by the authority for two tours each of two years with prospects of permanency.

Salary according to age and experience in scale (including bonus and overseas and temporary allowances) £1,380 rising to £1,619 a year. Gratuity at rate of £150 a year whilst serving on temporary terms.

Superannuation scheme similar to C.E.G.B. scheme on admission to permanent establishment. Outfit and settling in allowances £35 (£75 if accompanied by wife). Children's educational grants in certain circumstances. Free passages and furnished quarters. Liberal leave on full salary.

Candidates, under 45 years of age, must have served an apprenticeship in an engineering works and have had considerable experience in the operation of a modern steam generating station. Preference will be given to candidates who hold a recognised engineering qualification.

Write to the Crown Agents, 4, Millbank, London, S.W.1. State age, name in block letters, full qualifications and experience and quote M2C/49901/EF. 4190

ATTRACTIVE VACANCIES

exist at a West Midlands firm

for

Senior and Junior Transformer Design Engineers

with experience of transformers up to 20 MVA.

Situations are permanent and progressive.

APPLY giving full details of experience and salary required, to—Box 4211.

APPRENTICE TRAINING CENTRE

VICKERS-ARMSTRONGS (SHIPBUILDERS) LIMITED

APPLICATIONS are invited for the following pensionable staff vacancy :—

AN ELECTRICAL INSTRUCTOR.

The Instructor appointed will be required to prepare craft apprentices for the City and Guilds of London Institute Examinations.

Candidates should possess sound technical qualifications as well as the highest personal qualities and a genuine interest in and flair for the training of young persons. The salary offered will be within the Burnham Scale framework.

Applicants should state their present salary, the salary they require, and should submit their applications to the Personnel Manager, Naval Yard, Walker, Newcastle upon Tyne, 6.

4103

SURREY COUNTY COUNCIL

APPLICATIONS invited for appointment of ASSISTANT ELECTRICAL ENGINEER, Special Grade, £750-£1,030 p.a. plus £30 p.a. London allowance. Must be A.M.I.E.E. and experienced in electrical services in buildings.

Full details, present salary and 3 copy testimonials to County Architect, County Hall, Kingston-on-Thames, as soon as possible.

4075

NATIONAL COAL BOARD NORTH WESTERN DIVISION

Divisional Headquarters

SENIOR ELECTRICAL ENGINEERING DRAUGHTSMAN in the Electrical Engineering Branch.

Duties involve general drawing office work including diagrams and layouts associated with reconstruction work and generally with the application of electricity to mining.

Ordinary National Certificate in Electrical Engineering essential and a Higher National Certificate an advantage. Previous experience in or associated with mining equipment whilst not essential is desirable.

Salary within the range £775-£1,035 per annum.

Applications giving age, education, experience, present post and salary to Divisional Chief Staff Officer, 40, Portland Street, Manchester, 1, by 25th July, 1958. 4208

JOSEPH LUCAS

(ELECTRICAL) LIMITED

Great King Street, Birmingham, 19

ENGINEER

EXPANSION of development of ignition equipment for gas turbines and allied projects creates a vacancy for a practical engineer with experience of design for economic production of electrical apparatus. The work is of a high technical standard and applicants should preferably possess an honours degree.

The post is permanent and pensionable and offers considerable scope for advancement to a progressive engineer.

Apply in writing stating age, qualifications and experience to the Personnel Manager, Joseph Lucas (Electrical) Ltd., Great King Street, Birmingham, 19, quoting reference PM/D/190.

128

JOSEPH LUCAS (ELECTRICAL) LIMITED

ASSISTANT ELECTRICAL DESIGN ENGINEER

required for the design of rotating electrical machines and electro-magnetic devices. Projects will include fundamental design investigations, and full scope will be given for initiative and imagination.

The post is permanent and pensionable.

Apply in writing stating age, qualifications and experience to the Personnel Manager, Joseph Lucas (Electrical) Limited, Great King Street. Birmingham, 19, quoting reference PM/D/221.

125

M.K. ELECTRIC LIMITED

require an

EXPERIENCED SALES REPRESENTATIVE

for

NORTH-WEST OF ENGLAND

THE successful candidate will be required to live near Manchester. If you have experience in calling on architects, electrical wholesalers and contractors, are a car owner, and would like to join the sales team of a progressive company marketing products with a world-wide reputation, we would like to hear from you in confidence. Write in the fullest detail to:—

The Sales Manager, M.K. Electric Ltd.
Wakefield Street, London, N.18.

4154

SOUTH OF SCOTLAND ELECTRICITY BOARD

Stirling Area

APPLICATIONS are invited for the post of THIRD ASSISTANT ENGINEER in the Test and Protection Department at Area Headquarters.

Conditions of service will be in accordance with the National Joint Board Agreement and the salary in accordance with Schedule A, Class J, Grade 10 of the Agreement (£885/£930 per annum).

Candidates should have had a sound engineering training with experience in the type of work to be undertaken, and be in possession of a National Certificate in Electrical Engineering or the equivalent, as a minimum technical qualification.

Application forms, obtainable from the undersigned, are to be returned not later than 4th August, 1958.

JAMES G. CURTIS,
Area Manager.

"Woodlands,"
St. Ninians Road,
Stirling.
9th July, 1958. 4195

CENTRAL ELECTRICITY GENERATING BOARD

Southern Division

APPLICATIONS are invited for the following position:—

ASSISTANT SHIFT CHARGE ENGINEER, Swindon Generating Station) (Ref. S/13.1016).

Applicants should have had previous experience in a modern generating station and manufacturing works experience would be an advantage. The post offers valuable operational experience and provides suitable training for a young engineer.

Applicants should possess H.N.C. or equivalent and preferably possess or be studying for qualifications leading to Corporate Membership of an appropriate professional institution.

Salary N.J.B. E/9, £740-£785.

Special application forms obtainable only from P. D. A. Oliver, Divisional Secretary, Central Electricity House, High Street, Portsmouth, should be returned by 30th July, 1958. 4206

LIVERPOOL REGIONAL HOSPITAL BOARD

ASSISTANT ENGINEER (Electrical) required on the staff of the Regional Engineer.

Applicants should have passed the institution examination and be Graduate Members of the Institution of Electrical Engineers; be experienced in the preparation of specifications, drawings and estimates for distribution schemes, electrical installations in hospitals and buildings and be able to take details of existing installations and have a good knowledge of modern installation practice.

Salary scale £700-£1,015 per annum. Starting salary depending on age and previous relevant practical experience.

Applications stating age, qualifications, experience, present and previous appointments with names and addresses of three referees (two technical) to reach me at 55, Castle Street, Liverpool, 1, by 5th August, 1958.

VINCENT COLLINGE,
Secretary to the Board.

4176

INTERNATIONAL SYNTHETIC RUBBER COMPANY LIMITED

SECURE employment in a new factory is offered to

ELECTRICIANS

to work shifts

Applications from persons who have had experience in the chemical industry especially welcome.

Generous sickness payment and superannuation schemes.

Subsistence payable until houses become available in about 12 months time.

This is a unique opportunity to settle your home in the lovely New Forest area.

Apply, giving full particulars of age, experience, etc., to the Labour Officer at Hythe, Hants.

4180

OXFORD REGIONAL HOSPITAL BOARD

Regional Architect's Department

(a) Electrical Engineer
(b) Heating Engineer

INTERESTING and responsible work on the design and installation of engineering services for new hospitals and alterations to existing ones.

Applicants for post (a) should be A.M.I.E.E., and for post (b) A.M.I.Mech.E., or equivalents. Previous hospital experience desirable but not essential.

Salary £1,010 to £1,195. Compulsory superannuation.

Applications by 1st August, 1958, with the names of two referees to Secretary, Oxford Regional Hospital Board, 43, Banbury Road, Oxford.

Further particulars available from the Regional Architect on request. 4083

CENTRAL ELECTRICITY GENERATING BOARD

Southern Division
S/13.1015

WAYLEAVE OFFICER,
Divisional Secretary's Department.

Applicants should be of good education, and have experience of negotiating with landowners and public and other authorities to arrange wayleaves in connection with overhead transmission lines, including settlement of claims for damage to crops, etc. Some knowledge of timber valuation and estate management, and of office organisation is desirable. Candidates should be car drivers.

Salary N.J.C. Grade 4, £765 × £25 to £840.

Special application forms obtainable from P. D. A. Oliver, Divisional Secretary, 111, High Street, Portsmouth, should be returned by 1st August, 1958. 4204

THE GENERAL ELECTRIC COMPANY LIMITED

Witton, Birmingham, 6

A YOUNG electrical engineer is required for work in connection with the preparation of tenders for transformers and associated gear.

Applicants should possess at least the H.N.C. (Electrical) or equivalent with some knowledge of estimating and tendering.

This appointment is progressive and a generous salary is offered, depending on qualifications and experience.

Please write with full particulars to:

The Staff Manager

4178

SOUTH EASTERN ELECTRICITY BOARD

DEMONSTRATOR, Lewes District. Salary £500 × £20 to £600 p.a. under N.J.C. Grade 1. Superannuable. Applicants should have diploma or certificate in domestic science, E.A.W. certificate.

Duties include lecturing, demonstrating, advising consumers and generally assisting in any of the district showrooms.

Applications naming 2 referees on forms from Lewes District Manager, SEEBOARD, 80/81, High Street, Lewes, Sussex, by 30th July, 1958.

GEORGE WRAY,
Secretary.
4203

NORTH EASTERN ELECTRICITY BOARD

Harrogate Sub-Area

APPLICATIONS are invited for the appointment of SECOND ASSISTANT DISTRICT ENGINEER, Thirsk District. Applicants should have had experience in the construction, operation and maintenance of H.V. and L.V. systems. Salary Schedule A, Class D, Grade 7, £790/£835. N.J.B. conditions of service.

Applications, stating age, qualifications and experience, to be received by the Assistant Secretary (Establishments), North Eastern Electricity Board, G.P.O. Box No. 117, Carliol House, Newcastle upon Tyne, within ten days of the appearance of this advertisement. 4207

NORTH OF SCOTLAND HYDRO-ELECTRIC BOARD

Aberdeen Area

GENERAL ASSISTANT ENGINEER is required for communications section of Technical Department. Salary £590-£680 (N.J.B. Grade G 14/13) depending upon qualifications and experience. Superannuation scheme applicable.

Duties will be on systems such as V.H.F. mobile radio, V.F.T., telemetering, power line carrier, normal telephony and supervisory equipment. Candidates should be technically qualified with some experience.

Application forms obtainable from the undersigned should be returned not later than 4th August, 1958.

J. E. WHITTAKER, B.Sc.(Eng.), M.I.E.E.,
Area Offices, Area Manager.
Millburn Street,
Aberdeen. 4210

CENTRAL ELECTRICITY GENERATING BOARD

London Division

APPLICATIONS invited for the following superannuable post. Conditions of service in accordance with N.J.B. Agreement, Schedule A. Salary includes London allowance. Qualifications entitling to Graduate Membership of I.E.E. or I.Mech.E. an advantage.

ASSISTANT ENGINEER
(Efficiency and Testing),
BATTERSEA POWER STATION
(Vacancy No. 58/516).

To investigate and advise the station superintendent on all matters concerning the thermal efficiency of the station. Salary Class L, Grade 9 = £1,115 p.a.

Applications, quoting vacancy number, to (or on form from) Central Electricity Generating Board, London Division, P.O. Box 136, London, W.1, by 28th July, 1958. 4173

CENTRAL ELECTRICITY GENERATING BOARD

South Western Division

BOILER HOUSE SHIFT CHARGE ENGINEER required at Portishead A Power Station.

Superannuation scheme. Salary N.J.B. Class J, Grade 9, £935 × £20 to £995 (plus 10% shift allowance).

Candidates should preferably possess technical qualifications admitting to corporate membership of a recognised professional institution and have had a sound mechanical training and experience in the design and operation of high pressure boiler plant.

Applications on Form A.E.6/ACT, obtainable from the Divisional Secretary, 26, Oakfield Road, Bristol, 8, should be completed and returned by 28th July, 1958. 4202

CENTRAL ELECTRICITY GENERATING BOARD

Southern Division
Ref. S/13.1017

FOREMAN required in the Non-destructive Testing Section of the Generation Operation Department.

The successful applicant will be required to supervise the repair, maintenance, construction and calibration of electronic and other instruments.

N.J.I.C. Schedule E, Grade 2, £665 or Grade 1, £715.

Applications, giving full details of age, training and experience, etc., should reach P. D. A. Oliver, Divisional Secretary, Central Electricity House, High Street, Portsmouth, not later than 28th July, 1958. 4205

AGENT with existing connections electrical wholesalers, supply authorities, large contractors in London area. High class electric fires, lighting fittings.—Box 9417.

ARMATURE winder. Progressive firm requires for repair shop a winder having sound knowledge all types A.C. and D.C. work. This company has other activities and there are good prospects of advancement for skilled man with initiative and some administrative ability. Write to Service Electric Co. Ltd., Honeypot Lane, Stanmore, Middx. 224

A SERVICE engineer. The Rheostatic Company Limited has a vacancy for a service engineer to operate in London and the Home Counties. Applicants should be between 25 and 35 years of age and have experience in the service and installation of light electrical equipment particularly in the field of control apparatus, preferably temperature control. A clean driving licence is essential. Initial training will take place in our Slough factory. Commencing salary up to £14 per week depending upon experience. Apply in writing to—Personnel Manager, Farnham Road, Slough. 4188

ASSISTANT production manager required by electric lamp manufacturers. Knowledge of electric lamp manufacture and modern production methods essential. Applications to works manager will be treated strictly confidentially.—Luxram Electric Limited, Knight Road, Strood, Rochester, Kent. 9411

CENTRAL London wholesalers (electrical and television) require salesmen who can bring business in on salary and profit sharing terms. Will also benefit through existing accounts. State salary and full particulars in strict confidence to—Box 4163.

CONTROL gear engineer required, age 23-35, for layout and circuiting of contactor equipment. Good salary. Permanent and progressive position. Canteen, pension scheme. Write stating age, experience and qualifications, if any, to Personnel Officer, Dewhurst & Partner Ltd., Inverness Road, Hounslow, Middlesex. 273

CROMPTON PARKINSON Ltd. require supervising electrical engineer (outside). Applicants should have a good general knowledge of industrial electrification and installation work including motors, transformers, switchgear, etc., together with actual experience of supervision of work at site, testing, and commissioning. Superannuated post. Write stating age (not exceeding 40), with details of past experience to—Contract Dept., Chelmsford, Ref. 1Co. 4121

ELECTRIC motors. Sales engineer wanted by firm (Birmingham area) to sell small fractional h.p. motors. Essential to have thorough knowledge of small motors and their manufacture in this very competitive field. Please write giving details of experience.—Box 4169.

ELECTRICAL contracts/sales engineer. Opportunity for young engineer with commercial outlook, minimum academic qualifications O.N.C., knowledge of meters and relays an advantage. Write in confidence giving full details, experience, age and salary, to—Secretary, Chamberlain & Hookham Limited, New Bartholomew Street, Birmingham, 5. 9421

ELECTRICAL design draughtsmen. A company located within easy reach of London and specialising in the manufacture of electrical control systems, are seeking the services of draughtsmen with experience in the circuitry and mechanical design of control panels, which embrace temperature controls and recorders, flow-meters, etc. The technical standard of applicants should be at least equivalent to the O.N.C. in electrical engineering. Very favourable conditions of employment offered including pension and life assurance entitlement. Apply, giving full details of training, experience and salary level, to—Box 4164.

ELECTRICAL engineer, aged 25-30 years, with experience of lighting and power schemes and M.V. distribution required for varied work in London office. Preference for candidates with H.N.C. Salary according to age and experience. Five-day week. Lunch canteen. Superannuation fund. Write fullest particulars to Staff Office, Rendel, Palmer & Tritton, Consulting Engineers, 125, Victoria Street, London, S.W.1. 4077

ELECTRICAL engineer required for preparation of schematic diagrams and associate detail engineering for automatic control equipment. Previous experience in this particular field of engineering essential. Good salary and prospects. Apply with full details to Personnel Officer, Dewhurst & Partner Ltd., Inverness Road, Hounslow, Middlesex. 3920

ELECTRICAL or mechanical engineer wanted by large German company for German-English translations. Applications are invited from British trained engineers with a good knowledge of German, who have an inclination towards translation work, and desire to work in a pleasant environment in Germany for at least 2 to 3 years. Write stating age, education, experience and salary to—Box 373.

Situations Vacant (continued)

ELECTRICAL industrial contractors urgently require energetic manager for branch office, age 28-40. Initiative and drive required for expanding business. Apply in writing giving details of experience to Managing Director, E.P.I. (B'ham) Ltd., 1, St. Martin's Row, Birmingham, 1. 9407

ELECTRICIANS wanted for large hotel in Bermuda. Must have extensive practical experience of installation and maintenance of lighting, power, kitchen equipment, refrigerators, lifts, etc. Some H.V. (up to 4,000 V) desirable. Applicants, single 30-35, should have Final C. & G. Electrical Installation Certificate, but consideration will be given to men with exceptional practical experience in maintenance of above equipment. Salary £100 per month (not subject to tax), plus room and board. Two year contract initially, subject to renewal by mutual agreement. Letters of application, giving age and full details of experience and qualifications to—Box 4181.

ENGINEER experienced all types overhead line work required for contracts in East Africa or Rhodesia. Write experience, giving age.—Box 3973.

JUNIOR laboratory assistant required for development and prototype work on a wide range of electro-magnetic devices. Applicants should have a good basic workshop training and some knowledge of electrical testing. A person with initiative and capable of working with minimum supervision is required. Preference will be given to applicants with O.N.C. (Elec.) or studying for this qualification. Apply giving full details of age, experience and salary required to Personnel Manager, Oliver Pell Control Limited, Cambridge Row, Burrage Rd., Woolwich, London, S.E.18. 4002

KEEN young draughtsman with machine shop training required for small production drawing office of company engaged in the manufacture of control gear equipment. Electro-mechanical experience desirable but not essential. Permanent and progressive position. 5-day week, pension scheme, canteen, etc. Apply giving full details of age and previous experience to Personnel Officer, Dewhurst & Partner Ltd., Inverness Road, Hounslow, Middx. 278

LIGHTING engineers. Excellent opportunity for men with commercial lighting experience to make a career with agents of leading lighting company in West Africa. Age 25-30. Attractive salary reviewed annually. Transport allowance. Passage paid for successful applicants and family. Free living quarters. Regular home leave. Write, giving full details, to—Box I.2, c/o Central News Ltd., Pemberton House, East Harding Street, London, E.C.4. 4214

MALE assistant required for electrical showrooms. Must be of good address with sales ability, trained in the electrical industry, including electrical installations, appliances, radio and television. Permanency. Age 20/30 years. Apply with full particulars to—Christy Bros. Limited, Chelmsford. 4165

REPRESENTATIVES required by old-established manufacturers of lighting fittings. Territories available in Scotland, Northern Counties, Wales and London. Great prospects of advancement to branch managers for keen men. Salary, commission, etc.—Box 4166.

SALES engineer required by old-established manufacturing firm near Birmingham making light engineering products. Considerable experience of production engineering is essential. Selling connection and experience is an advantage but not essential. Please send full details to—Box 4168.

SALES engineer to operate from London office of leading electric motor manufacturer. Permanent progressive post with bonus and pension scheme. Apply, giving age, education, training, experience and salary required, to —Box 4144.

SALES representative required for London area by established electrical domestic appliance manufacturers. Essential knowledge of wholesalers, merchants, etc. Salary and commission basis, existing accounts handed over. —Box 4105.

SWITCHGEAR designer required for M.V. and H.V. air and oil break switchgear. Works situated 20 miles N.W. London. Good prospects, salary commensurate with technical qualifications and ability. Housing assistance. Applications marked "Confidential," stating age, experience, etc., to—Chief Engineer, J. G. Statter & Co. Ltd., Amersham Common, Bucks. 4216

SENIOR cost accountant required by old-established electrical contractors to take charge of billing and costing department. First-class experience essential. Write stating age, experience and salary required to—Box ER.530, c/o 191, Gresham House, London, E.C.2. 4159

SENIOR engineers reqd. with a view to taking control of a group engaged in the design of precision regulated power supplies. Candidates should be in age range 30-40 and have a degree in electrical engineering together with some industrial experience. Knowledge of Servo control using transistor and magnetic amplifier techniques as applied to regulated power equipment would be an advantage. The position will carry a substantial salary according to age and qualifications. Applicants are invited to send full details in confidence to the Staff Officer, Ref. 744/20, Siemens Edison Swan Ltd., Woolwich, London, S.E.18. 4167

SIMPSON, BAKER & Company Limited, require an enthusiastic representative at their London branch. One interested in training for management would be given preference. Remuneration by salary, commission. Expenses paid. Car provided. Superannuation scheme. Replies to be marked for the personal attention of the Branch Manager, 24/30, Gillingham Street, London, S.W.1. 4215

SITE supervisors and plumber-jointers required for cable installation work throughout the country including North London. Apply—Box 4213.

TECHNICAL representative required by Northern manufacturer of specialised flameproof and industrial lighting, cable gland and sound power telephones. Territories, London and Home Counties. Pension scheme, company car, remuneration commensurate with age, experience, qualifications, etc. Please apply with full details to—Box 4217.

TECHNICAL representatives required fully conversant with surveys, design and installation of electrical space heating equipment. Applicants preferably with established contacts in the electrical industry and with architects, local and county authorities. Two appointments open only; (1) Lancs., Yorks. and North Wales area (based Manchester); (2) Midlands area (based Birmingham). Reply stating age and salary required to the Manager, Ekco Heating, E. K. Cole Ltd., 5, Vigo Street, London, W.1. 4171

TENDERING engineer. The London office of a large electrical engineering company has a first-class opportunity available for a tendering engineer with motor and alternator estimating experience. The office is in the West End of London, and applications are invited from men or women with engineering training and previous experience in a similar appointment.—Box 4182.

THOMAS FRENCH & SONS Ltd., Chester Road, Manchester, 15, require a technical sales representative for their electrical division. The successful applicant will have a sound electrical background, and will be capable of applying this knowledge to various heating problems. Inter. B.Sc. standard is an indication of the minimum basic technical standard required. He will be based in the Manchester or London areas, but his activities will for some time necessitate extensive travel throughout the British Isles. The appointment offers excellent prospects to a man under 45. A car is provided and a pension scheme is in operation. Letters, in confidence, should be addressed to the Home Sales Manager giving age, education, technical background and brief tabulated details of career to date, including present earnings. 4187

WORKSHOP instructor (electrical installation) required by the Government of Cyprus Education Department for one or two tours of 21 months either (i) on agreement with prospect of permanent and pensionable employment or (ii) on contract with gratuity at rate of £100 a year. Salary scale (including overseas allowance and present temporary allowance of 25% of salary) £1,044 rising to £1,435 a year. Outfit allowance £30. Free passages. Education grant payable in certain circumstances. Liberal leave. Candidates must have served an apprenticeship to electrical engineering, have had subsequent experience and possess a C. and G. Full Technological Certificate in electrical installation work and preferably in electrical engineering practice. Write to the Crown Agents, 4, Millbank, London, S.W.1. State age, name in block letters, full qualifications and experience and quote M2C/42421/EF. 4189

APPOINTMENTS FILLED

Dissatisfaction having so often been expressed that unsuccessful applicants are left in ignorance of the fact that the position applied for has been filled, may we suggest that Advertisers notify us to that effect when they have arrived at a decision? We will then insert a notice free of charge under this heading.

SITUATIONS WANTED

CONSULTING engineers: Senior engineer requires appointment. Designs, specifications, supervision; 16 yrs.' experience.—Box 9401

ELECTRICAL sales engineer, 32, A.M.I.E.I., A.M.I.B.E., A.M.A.S.E.E., seeks position as technical representative.—Box 9418.

EXECUTIVE, extensive experience electrical wholesale industry, seeks responsible position London.—Box 9415.

FOREMAN electrician and electrician seek positions preferably but not necessarily overseas. Time served 16 years in trade. Experience all types of installations.—Box 9410.

MAINTENANCE supervisor, wide industrial experience installation and maintenance, incl. diesel alternators, seeks change. —Box 9416.

M.I.E.E., 48 years old, seeks change overseas. Experience in electricity supply at managerial level, consulting and maintenance. Last 10 years in Africa. Available for interview in U.K. mid-September.—Box 9414.

REP., first-class industrial and commercial connection in East Anglia and South Midlands, seeks change.—Box 9408.

YOUNG man, 32, A.M.A.S.E.E., manager contracting business, seeks position where practical knowledge and adaptability is of more value than business acumen and where opportunity of further study is available. Suggestions welcomed. All replies acknowledged.—Box 9420.

ARTICLES FOR SALE

T.W.W.

Large A.C. Motors
3-phase, 50 cycles

Maker	H.P.	Volts	R.P.M.
B.T.H.	1,820	3.3 kV	368
B.T.H.	1,800	400/440	368
MATHER & P.	350	400/440	720
METRO-VICK.	310	400/440	1,440
MATHER & P.	300	400/440	720
BRUSH	250	400/440	420
B.T.H.	250	400/440	480
MATHER & P.	200	400/440	960
BROOK	110	400/440	580
BROOK	110	400/440	960
CROM. PARK.	100	400/440	480

THOS. W. WARD LIMITED
Albion Works, Sheffield
(Phone 26311, ex. 347; Grams, "Forward") 376

STEAM ENGINE FOR SALE

GOOD secondhand BELLISS & MORCOM vertical 3-cylinder compound steam engine. One high and two low pressure cylinders 25" dia. × 18" stroke, 300 r.p.m. Steam pressure 100/130 lb. p.s.i. against back pressure of 2/10 lb. p.s.i. Been driving a 600-kW alternator.
REED BROTHERS (ENGINEERING) LTD.
Replant Works
Woolwich Industrial Estate
London, S.E.18
(Telephone: Woolwich 7611/6) 4194

ELECTRIC HOUSE SERVICE METERS

PREPAYMENT and credit, 200/250 v. A.C., s/p., 50 c., 2½-100 A. Fixed or variable tariff. Reconditioned, fully tested and guaranteed 2 years. Prompt delivery, carriage paid.
ALBERICE METER COMPANY
Fairfax Works, Fairfax Rd., London, N.8
(Tel. MOUntview 7944, 6373) 191

DIESEL ALTERNATOR SETS

SEVEN 72.5-kVA A.E.C./G.E.C. diesel alternating sets, 400/440 v., 3-phase, 50 c/s, 1,500 r.p.m., with switchgear, all in good working order. Lying in London.
THOS. W. WARD LTD.
Brettenham House, London, W.C.2
(Temple Bar 1515, 12 lines) 4160

SOUTH LIVERPOOL HOSPITAL MANAGEMENT COMMITTEE

Sefton General Hospital

SALE OF STEAM ENGINE DRIVEN GENERATORS

THE Committee have for disposal three ASHWORTH & PARKES Steam Engine Driven D.C. Generators, one 120 kW and two 50 kW, suitable for steam at 120 p.s.i., all in good working order.

These machines may be seen by arrangement with the Superintendent Engineer, and offers must be submitted to the undersigned not later than seven days after the appearance of this advertisement.

GARNET CHAPLIN,
Secretary to the Committee.
4161

ROLLING MILL DRIVES

FOUR 400-h.p. Rolling Mill Slipring Motors by the ENGLISH ELECTRIC Co., wound for 415 volts, 3-phase, 50 cycles, 738 r.p.m., coupled to gearbox by POWER PLANT Co., final speed 30 r.p.m. High speed shaft with two flywheels, total kinetic energy 10,000 h.p. seconds. 30 h.p. barring motor and automatic IGRANIC control gear with slip-resistance.

750-h.p. Rolling Mill Motor by BROWN BOVERI, date 1954; 2,200 volts, 3-phase, 50 cycles, 146 r.p.m.

GEORGE COHEN SONS & CO. LTD.
Wood Lane, London, W.12
(Tel. Shepherds Bush 2070) and
Stanningley, Nr. Leeds
(Tel. Pudsey 2241) 4183

NEW OXFORD TRANSFORMER WELDERS

For Immediate Delivery

160/450 amp. sizes, oil cooled pattern for operation on 400/440 v. single phase, or 200/240 v., dual welding voltage 50/80; in-built coarse and fine regulators.

Prices as follows: 450 amp. £135.
350 amp. £99 10s.
250 amp. £71.
180 amp. £45.

GEORGE COHEN SONS & CO. LTD.
Wood Lane, London, W.12
(Tel. Shepherds Bush 2070) and
Stanningley, Nr. Leeds
(Tel. Pudsey 2241) 3850

ELECTRIC MOTORS FOR SALE

FOUR 90-h.p. BRUSH Slipring Motors, 400/440-3-50-1,460 r.p.m., with o.i. starters.

45-h.p. BROOK S.C. Motor, 440-3-50-410 r.p.m., with o.i. Star Delta starter.

Five 200-h.p. E.C.C. 500-volt D.C. Motors, 425 r.p.m., with BROOKHIRST panels.

120-h.p. MET-VICK. 500-volt D.C. Motor, 500/700 r.p.m., with starter.

45-h.p. MET-VICK. 500-volt D.V. variable speed Motor, 500/1,000 r.p.m., with starter.

REED BROTHERS (ENGINEERING) LTD.
Replant Works
Woolwich Industrial Estate
London, S.E.18
(Telephone: Woolwich 7611/6) 4193

SOUTH EASTERN ELECTRICITY BOARD

TENDERS are invited for surplus Rotary Converters, synchronous motor generators and associated switchgear. To obtain details and/or make arrangements to inspect, please apply to Mr. P. S. Watson, M.I.E.E., Brighton and Hove District Manager, Castle Square, Brighton (Telephone, Brighton 25831).

Tenders marked "Tender for Rotary Plant," must reach Secretary, SEEBOARD, 10, Queen's Gardens, Hove, 3, by 5.15 p.m. on 31st July, 1958.

G. WRAY,
Secretary.
4170

400-kVA TRANSFORMER

ONE ENGLISH ELECTRIC Transformer, BSS 171-1936, 400 kVA, 3-phase, 50 cycles, 6,662 volts input, 443 volts no load.

Richard Wilson
Bradford Road, Stanningley, Pudsey, Yorks
(Tel. Pudsey 4291/2) 4146

HOUSE SERVICE METERS

200-240-v. A.C. or D.C., 10 amps. capacity, quarterly type, from 25s. each, plus 2s. 6d. carr.

UNIVERSAL ELECTRICAL CO.
221, City Road, London, E.C.1 37

A.A. ELECTRICAL Co. for A.C.-D.C. motors, switchgear, exhaust fans, hoists, reduction gears, new or reconditioned units.—CHI. 5105. 67, Rothschild Rd., London W.4. 57

BABCOCK & Wilcox water tube boiler will cut down your fuel costs; we can supply from stock. Two 40,000 lb. evap., 220 lb. w.p.; one 25,000 lb. evap., 200 lb. w.p.; 3,000 lb. evap., 400 lb. w.p.; Spencer Bonecourt boiler; also Marine, Cornish vertical, etc.—Burford, Taylor & Co. Ltd., Boiler Specialists, Burtayco House, Church Street, Middlesbrough (Tel. Middlesbrough 2622). 122

A.C. and D.C. motors, generators, from stock.—Service Electric Co. Ltd., Honeypot Lane, Stanmore, Middx. (Edgware 5566/9). 91

A.C. and D.C. 1/- slotmeters. Guaranteed 2 years, 2½-50 amps. From 50/-. Repairs and recalibrations. See Billiard: Tradex Meter Co., Surbiton (Tel. Elmbridge 4487). 169

A.C. diesel sets, 10 kVA to 500 kVA; alternators 2.75 kVA to 375 kVA; A.C.-D.C. plating M.G. sets, 6/10 v., 250 to 1,500 amp. sizes, separate dynamos, rectifiers; two 20-kW, 110-v. dynamos; automatic sets, 2½ to 6 kW, 230 v. A.C.; Dales, Morrison, Startomatics, etc.—E. Binns, Works, 156a, Falsgrave Rd., Scarborough. 9419

ALTERNATORS, generators, 1-100 kVA, all voltages. Specialists—Powerco Ltd., 312, York Rd., London, S.W.18 (VAN. 5234). 147

ALTERNATORS, 3-phase, all sizes in stock from 7 kVA up to 330 kVA.—Britannia Manufacturing Co. Ltd., 20/26, Britannia Walk, London, N.1 (CLErkenwell 5512). 24

ALTERNATORS from ½ to 675kVA in stock, single and three-phase, all voltages and frequencies. Guaranteed. Many unused. Send your requirements.—Fyfe, Wilson & Co. Ltd., Station Works, Bishop's Stortford. 162

BARGAINS in electric motors from A. Cooksley & Co. Ltd., 21/25, Tabernacle Street, London, E.C.2. Ring Monarch 3355. 50

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The trading of the company and its subsidiaries for the year 1957 resulted in a profit before taxation of £243,164, which is £28,931 less than the corresponding figure for the previous year.

Whilst the rate of output achieved in 1956 was maintained in 1957, there was a reduction in the volume of deliveries of subscribers' apparatus to the British Post Office. However, this was offset by increased deliveries in other directions, in particular of line transmission equipment, and of subscribers' apparatus for overseas customers. But in the latter case price levels are not profitable.

The percentage of our sales exported increased from 19% in 1956 to 26% for 1957.

Last year I expressed some anxiety about the effect on our order book resulting from curtailment of the activities of the British Post Office brought about by the credit restrictions and the increase in tariffs. The Post Office was forced to ask the industry to accept reductions on the contracts placed and to spread delivery of the balance outstanding over an extended period. In addition the orders placed in 1957 for subscribers' apparatus were negligible, nor will there be any improvement in the current year. It seems likely, therefore, that trading conditions for your company will remain poor until perhaps the latter part of 1959.

We are concentrating on development work to enable us to expand our business. Such a policy is essential if we are to become less dependent upon Post Office stores business in the future and we have adequate financial resources for this purpose.

The report was adopted and the total distribution of 10% was approved. 4162

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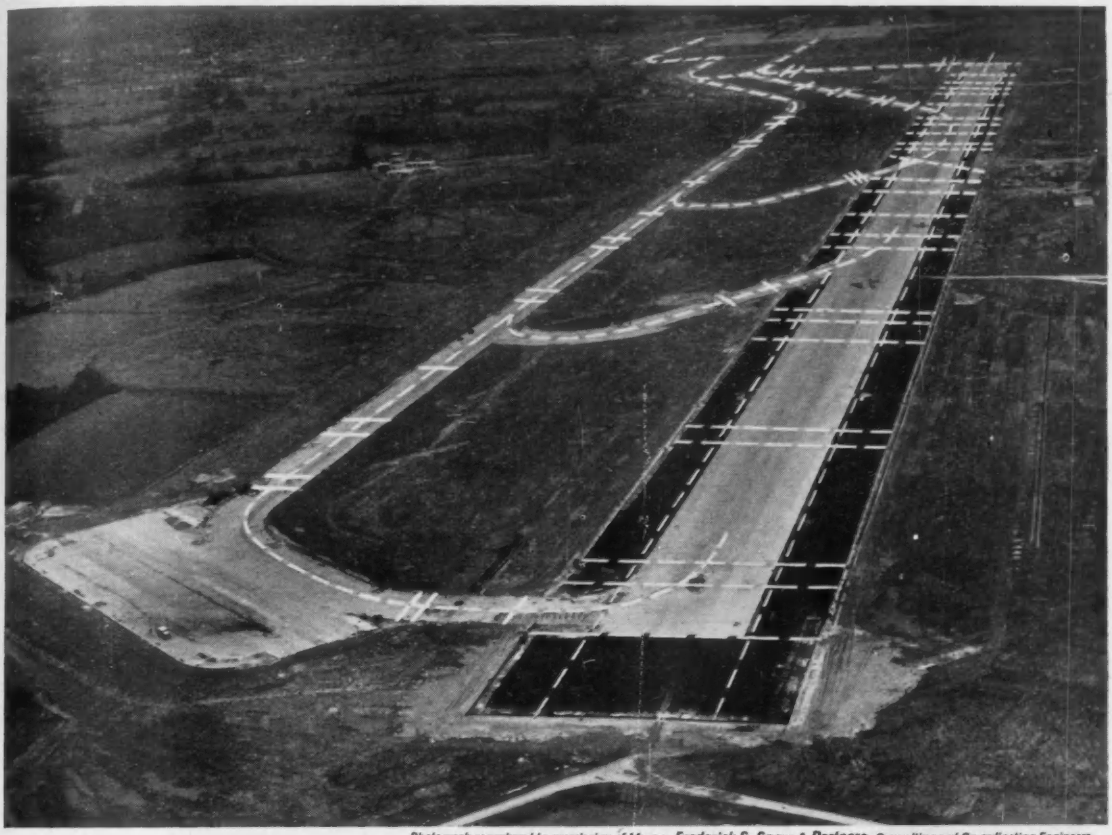

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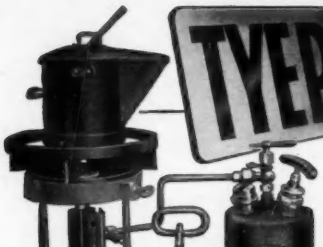

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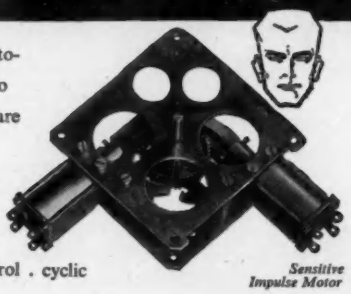

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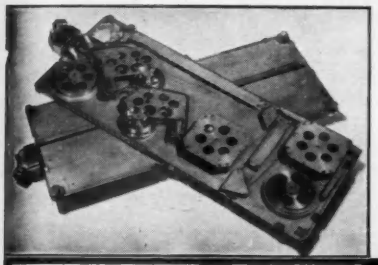

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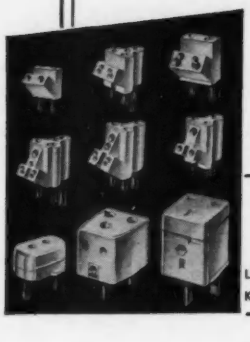

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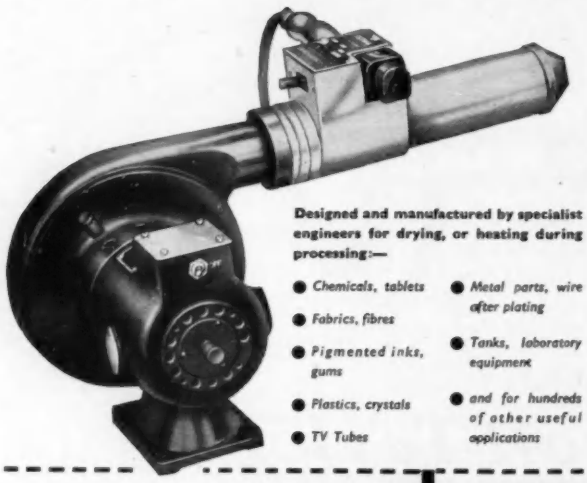

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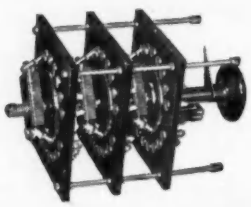

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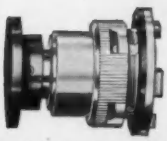
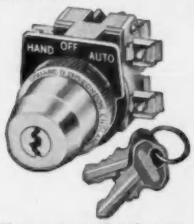


Pushbuttons — Full guard, half guard and mushroom types in many colours.



Key-operated selector switches—Two and three positions with choice of key withdrawal arrangements.

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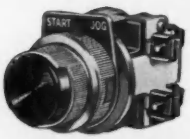

Selector pushbuttons—Combine features of both types of operations. Many combinations available.

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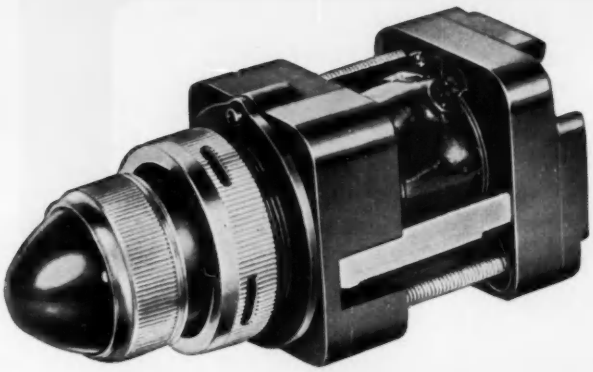

Oil-tight construction. Give positive contact 'feel' in the test position—eliminating contact doubts in the event of bulb failure.

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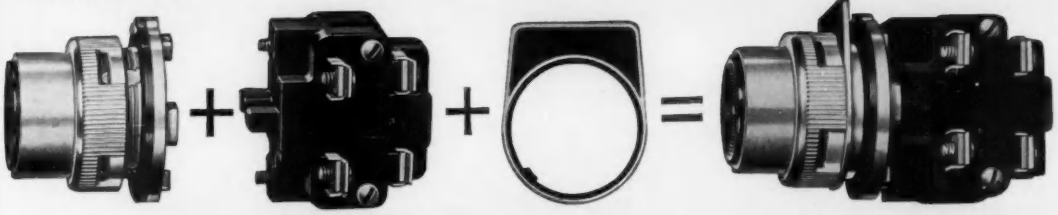

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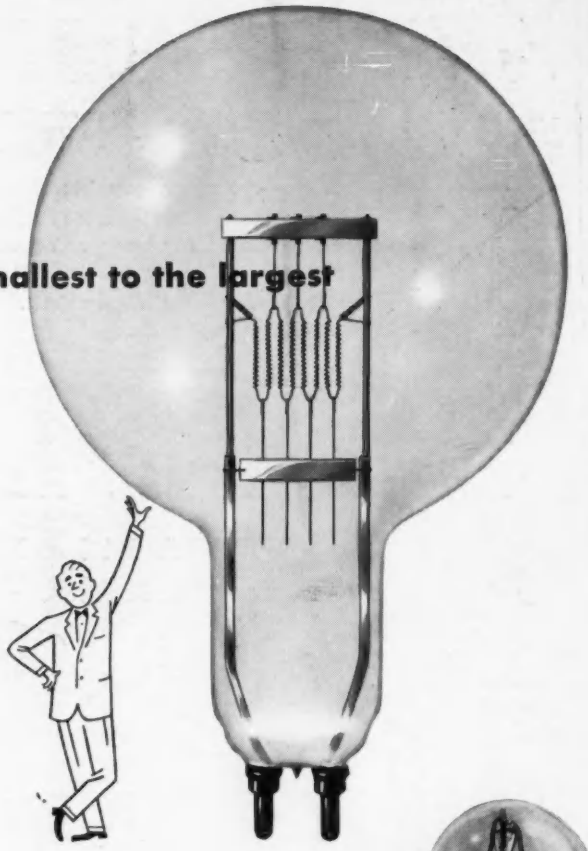
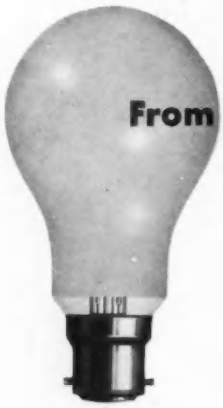
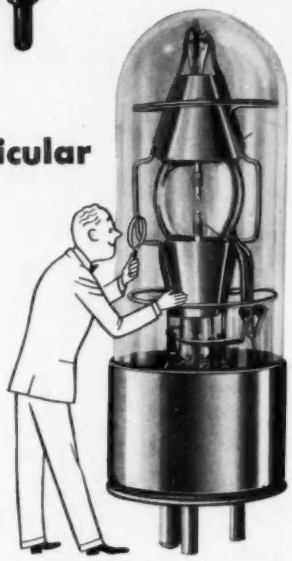




From the general to the particular



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